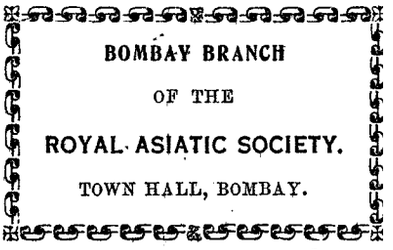
Survey Operations in Bengal

report

1897-98 & 1906-07.

00133047



Digitized with financial assistance from

Government of Maharashtra

on 01 February, 2020

ANNUAL REPORT

BY ORDER OF THE LIEUTENANT GOVERNOR OF BENGAL
FORWARDED

ON THE

SURVEY OPERATIONS IN BENGAL

DURING THE YEAR

1897-98. to 1906-07

From 1st October 1897 to 30th September 1898.

133047

LIBRARY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC SOCIETY

Calcutta:
BENGAL SECRETARIAT PRESS.
1899.

00133047

INDEX TO CONTENTS.

CHAPTER I.

PAGE

GENERAL REMARKS ON THE PROVINCIAL SURVEYS 2

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND ON RECORDS OF RIGHTS IN TEMPORARILY-SETTLED TRACTS AND GOVERNMENT ESTATES UNDER SETTLEMENT OF RENTS AND LAND REVENUE.

MINOR SETTLEMENTS.

CHITTAGONG DIVISION .	NOAKHALI DISTRICT—GOVERNMENT ESTATES . .	18
BURDWAN „ .	MIDNAPORE „ MAJNAMUTHA ESTATE . .	20

PART II.—REPORTS ON SURVEYS AND ON RECORDS OF RIGHTS IN PRIVATE ESTATES.

MAJOR SETTLEMENTS.

PATNA DIVISION . .	SARAN	DISTRICT—TRAVERSE	SURVEY .	21
	„	„ CADASTRAL	„ .	23
	„	„ TOPOGRAPHICAL	„ .	26
	DARBHANGA	„ TRAVERSE	„ .	27
	„	„ CADASTRAL	„ .	28
	MUZAFFARPUR	„ TRAVERSE	„ .	32
	„	„ CADASTRAL	„ .	*ib.*
	„	„ TOPOGRAPHICAL	„ .	33
	CHAMPARAN	„ TRAVERSE (ARREARS)	COMPUTATION	*ib.*

PART III.—REPORTS ON SURVEYS AND ON RECORDS OF RIGHTS IN WARDS' ESTATES.

PATNA DIVISION . .	GAYA	DISTRICT—TIKARI WARD'S ESTATES . .	33
	MONGHYR	„ NARHAN „ „ . .	*ib.*

PART IV.—REPORTS ON MISCELLANEOUS SURVEYS.

PATNA DIVISION . .	DARBHANGA	DISTRICT—SOMASTIPUR MUNICIPALITY .	34
	MUZAFFARPUR	„ MANIKPUR-SADIPUR DISPUTE .	36
	„	„ MAUZA GOBINDPUR TERA RASIA	*ib.*
	PATNA	„ RAILWAY GHAT SURVEY . .	*ib.*
	SHAHABAD	„ KACHNAR MAHAL . . .	37
BHAGALPUR DIVISION	BHAGALPUR AND PURNEA DISTRICTS.	NIPAL FRONTIER . . .	38
ORISSA „ .	ORISSA DIVISION—REVISION SURVEY . . .		44

CHAPTER III.

		Page
PART I.—PROGRAMME OF SEASON 1898-99		45
„ *II.*—TOURS OF THE SUPERINTENDENT OF SETTLEMENT-SURVEYS		47
„ *III.*—INSPECTION BY THE DEPUTY SURVEYOR-GENERAL		48
„ *IV.*—SERVICES OF OFFICERS		*ib.*
„ *V.*—	CO-OPERATION OF LANDLORDS, &c.	49
	DITTO OF REVENUE OFFICERS	*ib.*

LIST OF APPENDICES.

APPENDIX I.—SUMMARY OF OUTTURN		51
„ *II.*—STATEMENT OF EXPENDITURE		52
„ *III.*— DITTO OF COST RATES PER SQUARE MILE		58
„ *IV.*— DITTO OF INSPECTIONS BY OFFICERS		*ib.*
„ *V.*—REPORT ON THE BENGAL DRAWING OFFICE		59

LIST OF INDEX MAPS.

PROVINCE OF BENGAL	*To face page*	1
NOAKHALI DISTRICT	„ „	18
SARAN „	„ „	21
DARBHANGA „	„ „	27
MUZAFFARPUR „	„ „	32

ANNUAL REPORT

OF

THE SUPERINTENDENT OF SETTLEMENT-SURVEYS

ON THE

SURVEY AND RECORDS OF RIGHTS OPERATIONS IN BENGAL

DURING THE YEAR 1897-98.

No. $\frac{2357}{R.-7-50.}$

From Captain R. T. CRICHTON, I.S.C.,
Superintendent of Settlement-Surveys in Bengal,

To the SECRETARY, BOARD of REVENUE, LOWER PROVINCES.

Dated Mussoorie, the 11th October 1898.

Sir,

I have the honour to submit the report on the provincial survey operations for the period from 1st October 1897 to 30th September 1898.

These operations were under my administration during the entire year under report.

CHAPTER I.

GENERAL REMARKS.

Programme of the year.

2. The programme for 1897-98, as sanctioned by Government, provided for 34 square miles of traverse survey, 536 square miles of cadastral survey with records, and 26 square miles of topographical survey,—all in district Saran; also for 613 square miles of traverse survey and 710 square miles of cadastral survey with records in district Darbhanga. In Noakhali the cadastral survey with records of char Magdhora, covering an area of 9·45 square miles in the island of Sandip, was to be undertaken. Orders were also received for the relaying of the Nipal boundary touching on districts Bhagalpur and Purnea, and for the relaying of the boundary of the Kachnar Mahal in district Shahabad.

Provincial Outturn of the season.

3. The following tabular statement, giving the outturn in square miles, shows that the programme has been fully worked up to:—

Division.	District and estate.	Traverse survey.	Cadastral survey.	Record-writing.	Topographical survey, 16" scale.	City survey.
1	2	3	4	5	6	7
Temporarily-settled and Government Estates.						
Minor Settlements.						
Chittagong	Noakhali (Government estates)	...	10	10	...	...
Private Estates.						
Major Settlements.						
Patna	Saran	51	555	555	27	...
	Darbhanga	598	733	733	...	...
	Muzaffarpur	10	2	2	4	...
Miscellaneous.						
Patna	Muzaffarpur (mauza Tera Rasia).	...	...	...	3	...
	Darbhanga (Somastipur Municipality).	1	...	...	...	2
	Shahabad (Kachnar Mahal) ...	...	...	...	(*a*)	...
	Bhagalpur and Purnea (Nipal frontier).	...	...	...	(*a*)	...
	Patna (Railway ghat survey) ...	1	...	...	1	...
	Total ...	661	1,300	1,300	35	2

(*a*) Boundary survey only for purpose of relaying marks.

4. During the season under report—

There were 20,616 angular observations with the theodolite.
" 2,926 linear miles of traversing.
" 140 astronomical observations for azimuth.
" 4 connections to stations of the Great Trigonometrical Survey.
" 1,741 permanent marks embedded at village trijunctions.
" 14,521 temporary marks embedded.
" 1,027 villages embraced in the survey operations.
" 2,291,257 fields in these villages.
" 6,386 linear miles of test surveys.
" 612,292 entries checked in the records by Survey Officers and Inspectors.

The cadastral survey of the season is comprised in 2,317 sheets on the 16″=1 mile scale, and there are also 1,264 sheets containing the large scale (64″=1 mile) surveys of such village sites as it was impossible to find room for on the margins of the 16″ sheets. There are also 59 sheets on the 16″ scale containing the *diara* topographical surveys.

Provincial statement of Expenditure.

5. The following statement shows the expenditure incurred in the different districts during the year, inclusive of shares for control and of the 4 per cent. charge for instruments:—

Division.	District.	Traverse survey.	Cadastral Survey.		Topographical survey.	Total.
			Detail survey.	Record-writing.		
1	2	3	4	5	6	7
	Temporarily-settled and Government Estates.	Rs.	Rs.	Rs.	Rs.	Rs.
	Minor Settlements.					
Chittagong ...	Noakhali (Government estates).	....	310	1,160	...	(*a*)1,470
Burdwan ...	Midnapore (Majnamutha) ...	30	105	327	...	(*b*)462
	Private Estates.					
	Major Settlements.					
Patna ...	Saran	(*c*)6,941	(*d*)47,775	(*e*)58,024	725	1,13,465
	Darbhanga	(*f*)24,690	(*g*)56,282	(*h*)63,752	18	1,44,742
	Ditto (revision) ...	...	...	(*i*)2,696	...	2,696
	Muzaffarpur	(*j*)1,094	111	136	115	1,456
	Champaran	103	...	...	...	(*k*)103
	Wards' Estates.					
Patna ...	Gaya (Tikari ward's estate)...	276	...	...	...	(*k*)276
	Monghyr (Narhan ward's estate).	38	...	...	...	(*k*)38
	Miscellaneous.					
Patna ...	Darbhanga (Somastipur) ...	106	559	19	...	684
	Muzaffarpur (Manikpur) ...	20	...	...	...	(*k*)20
	Ditto (Gobindpur Tera Rasia),	...	...	...	95	(*l*)95
	Patna (Railway Ghat survey)	...	...	...	152	(*m*)152
	Shahabad (Kachnar Mahal)	446	...	...	...	(*n*)446
Bhagalpur ...	Nipal Frontier (redemarcation).	1,826	...	...	...	(*o*)1,826
Orissa ...	Orissa (revision) ...	22	...	...	...	(*p*)22
Bengal Drawing Office.	Bihar (*badars*)	...	3,791	...	...	3,791
	Orissa (*badars*)	...	1,741	...	...	1,741
	Chakla Roshnabad (*badars*)...	...	509	...	...	509
	Total ...	35,592	1,11,183	1,26,114	1,105	2,73,994

(*a*) This expenditure includes Rs. 589 for completion of records and pay of the Noakhali Detachment for October 1897 prior disbandment.
(*b*) Expenditure on completion of traverse computation, area extraction, and completion of records, &c.
(*c*) Includes Rs. 1,431, pay of traverse camp for October, also Rs. 2,921 for traversing in *diara* tracts.
(*d*) Ditto Rs. 105, arrears expenditure.
(*e*) Ditto Rs. 142, ditto.
(*f*) Ditto Rs. 2,555, cost of move of traverse camp and arrears.
(*g*) Ditto Rs. 1,407, arrears, area extraction, traces, &c.
(*h*) Ditto Rs. 4,880, arrears; also Rs. 1,461. cost of *badar* establishment in the field.
(*i*) This is expenditure on the revision of the *khanapuri* of Babu Ganeshwar Pershad Singh's villages, to be met by the zamindar.
(*j*) This comprises Rs. 217 for traversing for cadastral survey and Rs. 866 for traversing for topographical survey; also Rs. 11, arrears.
(*k*) This is expenditure on completion of traverse records received from late Nos. 4 and 5 Parties (Bihar).
(*l*) Expenditure met by the Settlement Department.
(*m*) Ditto met by East Indian Railway Company.
(*n*) Debitable to Bihar grant.
(*o*) Ditto to Bengal Government under head of "Political."
(*p*) Leave pay of two *tindals* employed during previous season in Orissa under the orders of the Deputy Surveyor-General.

6. The cost rates per square mile are—

Division.	District.	Traverse survey.	Cadastral survey.	Record-writing.	Topographical survey.
1	2	3	4	5	6
		Rs.	Rs.	Rs.	Rs.
Chittagong ...	Noakhali	...	31·33	60·40	...
Patna ...	Saran	108·04	85·89	104·29	...
	Do. (*diara* topographical).	108·04	...	...	26·36
	Darbhanga ...	37·01	74·86	78·32	...
	Muzaffarpur ...	108·30	74·00	90·66	...
	Ditto *diara* (topographical).	108·30	...	...	28·75

The cost rates for the other items of expenditure, which are all for arrears and miscellaneous surveys, have not been extracted.

7. The variations in rates for the different descriptions of work are due to the following reasons:—

Traverse Survey.

Traversing in Saran and Muzaffarpur districts.—The high rates of Rs. 108·04 and 108·30 are misleading. The actual rates for traversing in these districts are nothing like so high; but as the traverse section was employed at commencement of the season in these districts, the cost of the move from recess quarters, also pay of the section during October 1897, has been debited to these districts; and as the area accomplished is very small (only 61 square miles in the two districts together), the cost rate naturally works out very high.

Traversing in district Darbhanga.—The rate of Rs. 37·01 is a very fair one, especially considering the small average size of the villages. I do not think this rate can be much improved on except by increase of programme.

Cadastral Survey.

Cadastral survey in district Noakhali.—The rate of Rs. 31·33 is very good for such a small detached survey. The fields are, however, large (1·54 acres each), which lowers cost rates, and the expenditure on supervision has been very small (*vide* detailed report on Noakhali).

Cadastral survey in district Saran.—The rate of Rs. 85·89 per square mile is, I consider, satisfactory when we remember that the field only averages 0·30 of an acre (the smallest fields we have yet had to deal with in Bihar), and that a very considerable portion of the tract surveyed consists of village sites which have to be surveyed on the 64″ scale, for which ten times the ordinary rate has to be paid.

Cadastral survey in district Darbhanga.—The rate in this district works out to Rs. 74·86, which is satisfactory, with fields 0·42 of an acre. Generally the foregoing remarks against Saran apply here also.

Cadastral survey in district Muzaffarpur.—The rate of Rs. 74·00 is high, considering the large fields, but the whole area surveyed is only 2 square miles, and rates for such small areas are not reliable, nor of any use for comparison with past rates or as a guide to future probable expenditure.

Record-writing.

Record-writing in district Noakhali.—The rate of Rs. 60·40 is satisfactory on the whole, but I am disappointed that it did not work out lower still, considering the large size of the fields and the very simple tenures. It is, however, almost impossible to obtain low cost rates with small detached surveys.

Record-writing in district Saran.—Considering the very small fields and the extremely intricate *pattidari* tenures dealt with, the rate of Rs. 104·29 is fair. Under such circumstances the only way to arrive at lower rates is by decreasing the supervision, whereas, if anything, in such very difficult work, an increase of supervision is advisable.

Record-writing in district Darbhanga.—The rate of Rs. 78·32 is very good, considering the small fields and the amount of *pattidari* tenures. This low rate has only been arrived at owing to the successful accomplishment of an unusually large programme (733 square miles).

Record-writing in Muzaffarpur.—The remarks against rates for Muzaffarpur cadastral survey apply here also.

Topographical Survey.

Topographical survey (16″ scale), district Saran.—The rate of Rs. 26·36 is satisfactory. Area very small.

Topographical survey (16″ scale), district Muzaffarpur.—The rate of Rs. 28·75 is satisfactory. Area only 4 square miles.

Comparative Cost rates of Present with Past seasons.

8. In last year's report (paragraph 10 thereof) I expressed a hope that the cost rates of the present year would prove the soundness of the policy of retaining the full survey establishments throughout the famine year. A comparison of the present cost rates with those of the previous year is hardly fair to the latter, more especially so as regards the Saran district, owing to the abnormal difficulties experienced and the sudden reduction of programme during the famine, but it will be noticed that the cadastral survey rate in Saran has fallen from Rs. 271 to Rs. 190, or a reduction of Rs. 81 per square mile, and that the cadastral survey rate in Darbhanga has fallen from Rs. 166 to Rs. 153, or a reduction of Rs. 13 per square mile. Comparisons with the rates of foregoing seasons in districts Saran and Darbhanga (from the commencement of the survey operations in these districts) are satisfactory to the present season's work; and it must be remembered that during the period from 1892 to 1896 the Bihar survey party was double its present strength, and also that many other operations were in progress simultaneously in Bengal, which of course considerably lessened the share of cost of supervision debitable to Bihar; also as the work has proceeded, the fields met with have decreased in size year by year, and the intricacies and amount of the *pattidari* tenures have increased enormously.

Our establishments have of course gained considerable experience since the commencement of the operations, and our procedure now works very smoothly. From all the reports of the Settlement Department I think we can fairly claim that our records are better and much more complete than they have ever been before. Many extra items of work are now undertaken by the Survey Department, such as writing up of area slips for the landlords and *raiyats*, completion of *khewats* and *terijs*, etc., which all add to the survey expenditure; and it will be noticed that during the year under report we have been able, owing to the settlement of interior disputes during the field season, to submit completed records for attestation. All this must aid the Settlement Officers considerably in facility of working, even if it does not have a direct effect on the expenditure under the head of settlement.

General Principle.

9. The general principle of the past six years has been fully maintained during the year under report. This principle has been to maintain one

native establishment for all processes of survey and record-writing from the commencement of the survey until the attestation stage is arrived at, such establishment being jointly controlled by the Survey and Settlement Officers. The Survey Officers, besides being responsible for the accuracy of the survey, aid in the checking of the record-writing in the field, under instructions from the Settlement Department, and during recess supervise the completion of records and compilation of statistics, also under instructions from the Settlement Officers.

Survey Procedure.

10. In conformity with the general principle laid down above, the survey *amin*, immediately on completion of the survey, undertakes the *khanapuri* of the *khasra*, his *muharrir* (who has been employed as his chainman during the survey stage), at the same time, filling up the entries in the *khatian* and triplicate *parcha* slips for immediate distribution to the *raiyats* on the ground. During the recess season the *amins* and *muharrirs* extract one set of the field areas of their villages and enter the same (after they have been independently extracted and passed) in all the records, and then complete the abstracts (*terij* and *milan khasra*) and compile the crop statements, etc.

Field sheets.

11. As in previous seasons, the *amins* ink up their survey daily, and complete the map in every respect as to entry of conventional signs and colouring of water and houses, also hand-printing of adjoining names, etc. All this has to be done before the *khanapuri* stage is arrived at, and the *amins'* contract rate of payment for surveying includes all the above items. The field sheets are now very fair specimens of draftsmanship, and compare favourably with the sheets prepared under the old system, under which the *amins* only showed the field boundaries in pencil, and the map was finished in office by a large staff of draftsmen.

Topographical Survey of Diara Lands.

12. The instructions regarding the topographical survey of certain *diara* villages, which were approved by the Board for last season, have been adhered to during the year under report. The only *diara* tracts under survey were on the Gandak river between districts Saran and Muzaffarpur, and on the Gogra river between districts Saran and Ballia of the North-West Provinces.

The *diara* line, or line demarcating permanent cultivation from temporary cultivation in alluvial tracts, was duly laid down, after both these *diara* tracts had been traversed, and then the orders of the Settlement Department taken as to which villages should be cadastrally surveyed, the balance being taken up topographically on the 16″ scale, and being excluded from the operations under the Bengal Tenancy Act by Government Notification No. 42T.R., dated 1st June 1898. Of the 14 villages mentioned in the Government notification, 3 were, however, cadastrally surveyed for the Collector, as they are Government estates.

As the whole of the North Bihar districts had been previously notified for survey under the Survey Act [Act V (B.C.) of 1875], there was no necessity to notify the villages selected for topographical survey especially under that Act, but the Settlement Officer pointed out that the provisions of that Act, regarding taking the signatures of the inhabitants as to the correctness of the boundaries, had not been complied with. Accordingly traces of the boundaries were made and the signatures of the landlords, or their agents, taken thereon. These traces were then made over to the Settlement Officer, who issued the necessary notification in the terms of section 12 of the Survey Act.

District Boundaries.

13. By Government Notification No. 2598, dated 27th September 1888, the deep stream of the river Gogra was declared to be the district boundary between districts Saran and Ballia. The river Gogra changes its course considerably every rainy season, and the result is that villages borne on the

Collectorate roll of one district are now on the far side of the river, and consequently within the boundaries of the adjoining district. There was at first some confusion as to how we were to proceed and as to how far we could survey, and considerable correspondence ensued between the Settlement Officer and myself. The Settlement Officer eventually solved the difficulty by pointing out that the district boundary need not be the village boundary, and I then issued definite instructions that the survey should invariably extend to the farther bank of the river, and also that all villages undisputedly belonging to Saran, but lying on the Ballia bank of the river, be also surveyed. In such cases the Collectors concerned can decide about the transfer from one revenue roll to another hereafter. In the Gandak river *diara* our difficulties were further complicated by the fact that the river which forms the district boundary had completely altered its course in many parts since the survey of the Muzaffarpur district in 1893-94, consequently we had one boundary for the Muzaffarpur district as surveyed in 1893-94, and another boundary in accordance with the present position of the river. In the cases where the river has encroached since 1893-94 on Saran, and the portion between the old and present beds of the river consists of nothing but sand and waste lands, there is not much difficulty, as the tract can be added to the Muzaffarpur villages and the maps combined (provided the old boundary can be located on the ground, which is not always the case), but where the river has encroached on Muzaffarpur, the question becomes more complicated. The difficulty has been overcome by deciding that the district boundary is to be shown on our present maps as surveyed, *i.e.*, in accordance with the present position of the river, and that the boundary of 1893-94 is to be shown on the maps in red, with a note on the maps and traces that the 1893-94 boundary does not affect the area of the village. The maps of the Muzaffarpur district will also be corrected in accordance with these instructions and, where necessary, portions, as surveyed during the year under report, added to the parent villages. In some cases some of the villages, surveyed topographically during 1897-98, but which indisputably belong to Muzaffarpur villages (the remaining portions of which have already been cadastrally surveyed and attested), will now have to be completed in cadastral survey and records and amalgamated with the old maps. In order to do this, it will, I think, generally be necessary owing to the physical features having altered on account of the action of the river, to survey some way inland until we can locate sufficient common points of the former and present surveys to enable us to fit the two together accurately.

The procedure we have adopted is, I think, quite the best under the circumstances, and we gain thereby the following advantages:—(*a*) latest delineation of the district boundary, (*b*) maintenance of the village boundaries, and by showing the old boundary (or limit of attestation) in red the assurance that no lands will be twice attested.

I consider, however, that the proper way to deal with inter-district *diara* tracts, when it is known that the adjoining district will also come under survey in the course of a few years, is to notify a line of villages of the adjoining district (three deep or so, or anyway well beyond the likely limits of river action), and to survey these in connection with the *diara* villages of the district actually under survey. If this were done, there would be no difficulty in connecting the subsequent work with the *diara* survey. There might be a difficulty as regards the early recovery of costs in the villages specially notified for survey, but on this point I am not competent to speak.

Maps of Diara tracts.

14. The Settlement Officer stated that maps on the 4″=1 mile scale showing all the different *diara* tracts would be most useful to the Collectors for administrative purposes. Arrangements have been made for compiling such maps by reduction by pentagraph from the 16″ maps.

Temporary demarcation of boundaries.

15. The notices in duplicate calling upon the inhabitants to demarcate their village boundaries by means of earthen mounds at each bend of the

boundary were, as in previous seasons, distributed by the Collectors through the agency of the village *chaukidars*. As a rule the demarcation was very fairly done, and generally followed the revenue survey *mauza* boundaries, except in the *diara* tracts, where in waste lands the inhabitants do not often know their own boundaries and merely guess at the same. In such cases the surveyors have to either relay the boundaries or the differences are clearly marked on our maps.

Permanent marking of village boundaries.

16. All village trijunction points are marked by stones obtained from the Bengal Stone Company. All the intermediate traverse stations, whether actually on the boundary or at a slight distance thereform, are marked by clay cylinders locally obtained. In *diara* tracts and on disputed lands, only bamboo or wooden pegs are used to mark theodolite stations.

Rules for maintenance of permanent marks.

17. In paragraphs 16 to 21 of Part II, Chapter 4 of the Board's Survey and Settlement Manual, 1895, certain rules are laid down for the maintenance of permanent marks. Mr. C. Stevenson-Moore, while officiating as Collector of the Muzaffarpur district, drew up draft rules in amplification of the rules in the Survey Manual, and consulted me in connection with the same. It was decided that the baked clay cylinders could not be considered as permanent marks, and therefore need not be shown on the traces which are to be compiled for the Collectors. These traces will therefore only show the trijunction stones serially numbered right through for each district. My contention is that it is not necessary and a useless expense to attempt to mark permanently more than the trijunction stations of a traverse survey, if that survey is followed by an accurate professional survey, because, if the subsequent detail survey be accurate, every field corner is in its true geographical position, and can be used as the basis from which future measurements for relaying the boundary (when required) can emanate. Our experience in the revision of all professional surveys, such as that carried out by Colonel Barron in Muzaffarpur in 1885-86, and in the revision of the irrigation survey in the Cuttack district, has been that we do not require to refer to a single boundary mark (*vide* paragraph 10 of the Annual Report of 1894-95). In connection with the draft rules for maintenance of marks, I supplied the Collector with detailed instructions as to the best procedure for relaying marks which had been destroyed or moved.

Mr. Stevenson-Moore and myself came to the conclusion that the receipts which the Survey Department takes from the inhabitants for the safe preservation of marks do not bear any legal value, and therefore need not be made over to the Collector. We will, however, still continue to take these receipts, as so doing tends towards the preservation of the marks during the interval between traverse and cadastral survey.

As regards the preservation of permanent marks in Orissa, where stones were also used for selected intermediate stations, traces will be prepared in the Bengal Drawing Office next year, and arrangements have been made, at the request of the Director of Land Records, for the inclusion of the necessary sum to cover the expenditure in the budget for the coming financial year.

In Chittagong the District Officers have now been supplied with original plots on a small scale showing all boundary marks. As these original plots were no longer required by the Survey Department, it was considered an unnecessary expense to prepare traces of the same.

Unit of Traverse Survey.

18. To ensure the old revenue survey *mauza* being maintained as the unit of the map and record, the same precautions as noted in paragraph 12 of the Annual Report for 1895-96 were carefully followed. In addition, the special procedure adopted in *diara* lands during 1896-97 of providing each surveyor with traces from the old 4″=1 mile revenue survey maps to enable him to relay approximately the old boundaries, where necessary, has been extended, during the year under report, to all our traverse operations, and each line-clearing *tindal*, as well as each surveyor, is now provided with such a trace

to enable him to discover discrepancies in the temporary demarcation, and to immediately report the same with a view to their rectification.

Unit of Cadastral Survey.

19. The unit of the cadastral survey was the "field," which is defined as follows:—"A field or survey number is an area of which the ownership is separate and the occupant is separate. Each parcel of land lying in one spot in the occupation of one person or of several persons holding jointly, or held under one title, provided it is all of one soil and is all rented at a uniform rate, shall have a separate number."

The *kiaris* or cultivating subdivisions of fields are not surveyed, and during the year under report any mention of the number of *kittas* contained within a field has been omitted from the record.

Thana maps.

20. During the year under report there was considerable correspondence between the Director of Land Records, the Settlement Officer of North Bihar, and myself regarding the provision of *thana* maps, showing all the contained villages serially numbered. These *thana* maps are required not only to act as indices to the numbering of the settlement *misls* stored in the Collectorate, but also for general administrative purposes. I obtained from the Bengal Drawing Office specimens of the standard sheets, as compiled on the 2″=1 mile scale for reduction by photography to the 1″ scale, and showed these to the Collector of Muzaffarpur and the Settlement Officer. On the 6th April 1898, I accompanied the Director of Land Records and the Settlement Officer of North Bihar to the Bengal Drawing Office in Calcutta, and after consultation with the Assistant Surveyor-General in charge, certain proposals were put before the Surveyor-General. It was decided that a specimen map of the Pupri thana in Muzaffarpur should be prepared on the $\frac{1}{2}$″ scale, showing the serial numbering of villages, rivers and main roads, and submitted to the District Officers for approval. The Settlement Officer afterwards showed me the proof map, and we agreed that the scale was too small and, I understand, the 1″ scale is to be tried.

At the same conference at Calcutta, certain other proposals, with a view to making the 1″ standard maps more useful for administrative purposes to the District Officers, were put forward and approved by the Surveyor-General. These proposals were shortly:—

(*a*) Blue prints of the 1″ sheets to be sent for inspection before publication to the Collector, the Settlement Officer, and the District Engineer.

(*b*) The Collector to furnish the Bengal Drawing Office with complete lists of all dák and inspection bungalows, police-stations and outposts, ferries, indigo factories and their out-works.

Scale of Survey.

21. The scale of the cadastral survey in Bihar and Noakhali was 16″=1 mile.

The topographical survey of the *diara* villages in district Saran was also on the 16″ scale.

The village sites in Bihar have all been surveyed on the 64″=1 mile scale, but in Noakhali, for reasons mentioned in the detailed report, the 16″ scale was found sufficient for the village sites also.

Survey of village sites.

22. The very intricate and difficult surveys of village sites on the large scale of 64″=1 mile in Bihar necessitated the use of 1,254 extra sheets. These extra sheets contain the surveys of village sites for which there was not room on the margins of the 16″ sheets. Special precautions have to be taken to ensure the absolute correctness of these surveys, because on this large scale an error of only two or three links is at once apparent. In addition to the

usual method of running *partal* lines through the main streets and *gullies*, entirely independent surveys of selected blocks are made, while the original survey is kept under lock and key. As the limits of *sahins* or homestead lands within the village site are often not traceable on the ground, great difficulty was experienced in carrying out the test surveys, and therefore orders have been issued that the corners of all *sahins* not clearly indicated on the ground are to be marked at the time of survey. In addition to these precautions, the European Survey Officers and Inspectors have orders to test the village site surveys while in progress.

In office the periphery of the village site, as surveyed on the 64″ scale, is reduced by pentagraph and compared with the periphery, as shown on the 16″ plan. Notwithstanding these very severe tests, very few village site surveys have to be rejected and resurveyed.

During previous seasons the areas of plots surveyed on the 64″ scale were extracted with the 16″ acre comb, and the result divided by 16, in order to arrive at the correct area on the 64″ scale. This procedure I considered unnecessarily laborious for small plots, and we now use combs on the 64″ scale, which save the subsequent division by 16. In large plots the old procedure is still followed to ensure greater accuracy.

Traverse Survey Rules.

23. During the year under report I revised the rules for traverse survey in Bihar in the light of the experience gained during the past five years. The main alterations and additions are with reference to the rules to be observed for the maintenance of the revenue survey *mauza* and the procedure to be adopted in all cases of differences; also the outturn to be expected in each class of work has been laid down, and the duties of the officer in charge of the traverse survey, both during the field and recess seasons, clearly indicated.

Cadastral Survey Rules.

24. The cadastral survey rules have not been altered, but additions to suit special procedures have been issued when necessary in the form of circular orders.

Survey of large villages.

25. At the commencement of the season there was some discussion as to the best method of dealing with large villages containing a very large number of fields, which could not be completed by one *amin*, in both survey and record-writing during the season.

It was decided that the first essential was to maintain one serial of numbering throughout the village records: therefore to permit of this, the following instructions were issued:—

(*a*) In large villages covering several sheets a separate *amin* to be put in for the survey of each sheet, and if the survey were, by this means, completed by an early enough date to afford reasonable hopes that one *amin* could complete the *khanapuri* of all the sheets, a picked *amin* to be detailed for the *khanapuri*.

(*b*) If, owing to the very large number of fields, it would be impossible for one *amin* to complete the whole of the *khanapuri*, then the number of fields on the first sheet to be counted off the map, and a separate *amin* put on to the *khanapuri* of each sheet simultaneously, the second *amin* starting his serial numbering in continuation of the serial of the first *amin*, and so on, *i.e.*, if it were found that the first sheet contained 2,000 plots, the first number of the second *amin's* serial would be 2,001.

The danger of this procedure (which is known in the Survey and Settlement Department in Bihar as the *Cherauth* system, owing to the first village surveyed and *khanapuried* under this system being named *Cherauth*) is that, if attendance is faulty at the survey stage, the fields as surveyed will not represent the true number of fields as ascertained at the *khanapuri* stage. If therefore the

number of fields at the survey stage falls short of the true number, it is necessary to give the extra fields fractional numbers, which is inconvenient; but if the number of fields at the survey stage is in excess of the number as ascertained at *khanapuri* (this often happens in the case of a rapid surveyor who, in preference to wasting his time waiting for attendance, surveys all *kiari* boundaries which he finds on the ground), then a gap in the serial numbering will occur and will have to be specially noted. To prevent, as far as possible, these inconveniences occurring, special precautions to ensure attendance at the survey stage were taken in all large villages. Another inconvenience is that the serial numbering of the village cannot of course be carried systematically from the north-west corner to its close in the south-east corner, and it is therefore difficult sometimes to immediately locate a certain plot on the map.

In Darbhanga eight large villages, one containing 19,000 plots, were successfully *khanapuried* on the *Cheranth* system, but in Saran fortunately the few large villages which could not be *khanapuried* by a single *amin* were subdivided into *tolas* comprising totally separate and compact *jamabandis*, which, with the approval of the Settlement Officer, were *khanapuried* separately.

Rules for record-writing.

26. The rules for record-writing remained the same as during previous seasons, but several additions were issued by the Settlement Officer in the form of circulars. The main changes are all referred to in the following paragraphs.

Completion of records. Office procedure.

27. At the request of the Settlement Officer, the columns in the *terij*, referring to cash-rent, produce-rent and rent-free, which had formerly been left blank by the Survey Department, were filled up in the Survey Offices.

On all traces a note as to the scale has been entered, as the Settlement Officer pointed out that such a note was required for the information of the Appellate Courts.

Triplicate parcha with area slips.

28. The adoption of a new form of triplicate *parcha* with area slips, alluded to in paragraph 24 of last season's report, necessitated the issue of supplementary instructions.

The new form comprises five portions. The first portion (next the binding space) is the *khatian* slip, next come two narrow slips for landlords and *raiyats* to contain the areas of fields, next comes the landlord's *parcha*, and last of all the raiyat's *parcha*. The *raiyat's parcha* form is made over to the *raiyat* on the entry of his first field, and he has to produce it for the entry of any subsequent field. The landlord's *parcha* is made over to him at the close of the *khanapuri*. The field areas of each plot are entered in the area slips during recess, and the landlords are invited to apply for their area slips from the Survey Office. The *raiyat's* area slip is left attached to the *khatian* slip, and submitted with the village records to be made over by the Settlement Department to the *raiyat*.

The filling up of areas in these slips imposes an extra task on the survey establishment, but is well worth the extra trouble and comparatively small extra expense. It was decided, in connection with the revision of the general contract rates, that 14 annas and 10 annas per 1,000 plots would be sufficient remuneration for the entry of areas in those slips and for the examination of the same.

Early commencement of record-writing.

29. Several methods were discussed with a view to the earlier start of record-writing generally, as it was acknowledged that the longer the period

over which the record-writing extended, the better would be the supervision, but it was decided that it would be impracticable to do more in this direction than we are now doing, *i.e.*, to start *khanapuri* immediately on the completion of the survey of a village (in large villages on the completion of survey of the first sheet thereof) without even waiting for the independent *partal* to be carried out.

Compilation of Khewats.

30. During the year under report the *khewats* have been compiled entirely by the Survey Inspectors, instead of by the *amins*. This procedure was tried in the Saran district during the preceding season with such success that it has now been extended to Darbhanga also. The Inspectors are provided with copies of the Collectorate *mauzawar* register, and show all differences in the present *khewats* in red. The difficulties in obtaining the attendance of the landlords and *birtdars* have been very great, but I venture to think that a great improvement will be found in the *khewats* of the season under report over previous seasons.

Boundary Disputes.

31. The boundary disputes in both Saran and Darbhanga have been fairly numerous during the year under report. At the request of the Settlement Officer all adjoining fields are now shown on the dispute traces submitted to the Settlement Department; also a *khasra* on a regular form relating to the fields shown on the trace accompanies the file.

Arrangements have also been made for the supply of an *amin* from the survey camps to any Assistant Settlement Officer requiring the same in connection with the settlement of boundary disputes.

Disputed entries.

32. A most welcome innovation in the procedure of dealing with entries disputed in the records has been introduced during the season under report. In addition to the usual staff of Assistant Settlement Officers (whose time is very fully employed in dealing with boundary disputes and the general supervision of the *khanapuri*), several *kanungos* were appointed in each district to deal with disputed entries. In Darbhanga, where four *kanungos* were appointed from the commencement of the season, the experiment has been a complete success. Out of a total of 41,500 disputes comprising 58,433 plots, all have been decided with the exception of a few containing only 4,987 plots, the columns regarding which remain blank in our records. This is a very different result to that of the previous season, when out of 57,968 plots disputed, only 15,434 were decided, and therefore 42,534 entries were left blank in our records for decision at the attestation stage. In Saran two *kanungos* only were appointed, and not till late in the season. Out of a total of 33,648 disputes (affecting 89,519 plots), 20,741 disputes have been decided, and the balance of 12,907 remain over for the attestation stage. In order to keep the *kanungos* informed of the number of disputes, a printed form was supplied to all Inspectors, who noted against each village in their circles the number of disputes instituted and decided, also the balance remaining for decision. These reports were received fortnightly in the survey camps and forwarded on to the Assistant Settlement Officers, who were thus able to direct the *kanungos* as to which villages they should attend to first. Notwithstanding this arrangement, in the cases of small villages containing only a few fields, the *khanapuri* was generally completed before the *kanungos* had time to inspect and decide the disputes, and in the majority of villages there were always some disputes left undecided at the time of completion of the record-writing. As it was considered most undesirable to leave the records out in the field after completion of the *khanapuri*, it was decided that, in all such cases, only the dispute lists and the *parchas* of disputed possession should be made over to the *kanungos*. In the *parchas* of disputed possession all four adjoining boundaries of each disputed plot were written up by the *amins*. This special procedure was adopted (as neither the map nor a trace thereof was provided) to enable the *kanungos* to locate the disputed plots without any doubt. On receipt of the dispute list in the survey camp office the

records were completed in accordance with the decisions of the *kanungos*, and the dispute lists were carefully compared by the record-keepers with the *khasras* and *khatians*, etc., in order to ensure all corections and additions having been properly made.

It has been decided that the decisions of *kanungos* in *pattidari-ijmali* disputes will be endorsed by the Assistant Settlement Officers.

In Noakhali there were 50 interior disputes, of which 11 were decided by the Settlement Officers during the progress of the record-writing.

Supply of Records to the Settlement Department.

33. During previous seasons it has been the custom to send all the records in one large batch to the Assistant Settlement Officers concerned at the close of the recess season, but the Settlement Officer has pointed out that, as attestation generally commences about the middle of October and all records have to be registered in the Settlement Offices before despatch to the several attestation camps, it is extremely difficult to deal with such a large mass of records in such a short time. Accordingly, during the past recess season completed records have been sent in large instalments at intervals; also to aid the Settlement Department in making out their attestation programmes, lists of villages are made out by Inspectors circles showing the *thana* numbers, the number of fields, the number of *khatians*, and the number of interior disputes still undecided.

Bengal "Badar" Establishment.

34. In paragraph 35 of last year's Annual Report, I referred to an increase of the Bihar "*badar*" establishment at the Calcutta Office, which was sanctioned by the Board, in the hope that the increase would enable the Bengal Drawing Office to deal promptly with the *badars*.

Notwithstanding this arrangement, complaints from the Settlement Department were constant, and I therefore decided, with the approval of the Board, to visit the *badar* office at Calcutta on the 12th December 1897, and to consult with the Surveyor-General and Assistant Surveyor-General in charge of the Bengal Drawing Office as to the best steps to take to meet the requirements of the Settlement Department. I found that there was a large number of *badars* in hand and a constant daily supply of the same coming in, and that the establishment, even with its late increase of strength, was inadequate to deal with the *badars* with the necessary promptitude. I found it would be impossible to arrange for an establishment of suitable strength at the Calcutta Office, because the receipt of *badars* is not constant, but depends on the season when attestation is being prosecuted, and even then on some days a large number of *badars* are received, followed by days with only a very few receipts. It is impossible in Calcutta to maintain a small establishment, and to increase and decrease it as necessity arises.

I therefore proposed to take away from Calcutta all the original sheets and area statements of the preceding season (1896-97), and to deal with the *badars* by means of small establishments under the direct control of the officers who were responsible for the original surveys. This proposal met with the approval of the Surveyor-General and of the Board; but as I found that the *badars* relating to the Saran district, still being received from the Settlement Department, referred back to work of the past three seasons, I decided to take away only the Darbhanga sheets and area statements, and to propose that the existing establishment of the *badar* office be not at once reduced, but be employed altogether on the Saran work, whereby all arrears would shortly be brought up to date. This amendment was also approved by the Surveyor-General and Board.

To deal with the *badars* of Darbhanga, a small establishment of 3 draftsmen and 2 area estimators was engaged at the survey camp office under the direct control of Mr. C. S. Kraal. The result has been most satisfactory, as out of 829 *badar* slips received, 825 have been dealt with and returned to the Settlement Department. I frequently inspected the *badar* office register, and was thus able to see that no *badar* slips were unduly delayed. The Darbhanga sheets of 1896-97 have now been returned to the Bengal Drawing Office to allow of the standard mapping being proceeded with.

During the coming season the sheets of the year under report of both Saran and Darbhanga will be retained in the field and the *badars* attended to under the direct supervision of the officers in charge of the cadastral sections.

The only disadvantages of this system are that it delays the publication of the standard maps by about one year, and that it throws some more work on to the camp officer, but once the camp officer has got his *badar* section into systematic working order, the extra amount of work entailed is trifling. The advantages are, I think, obvious:—

(*a*) The officer responsible for the original survey is the best person to deal with *badars* relating to his work.

(*b*) The establishment with the cadastral camp can be made elastic, as necessity arises, *i.e.*, in the case of a sudden rush of *badars* it can be temporarily augmented by draftsmen and estimators from the strength of the cadastral camp, and when work in the *badar* office is slack, the establishment thereof can be usefully employed in connection with the work of the camp.

Settlement Surveyor-Munsarims.

35. To each attestation camp a surveyor-munsarim is attached to survey all alterations which may have occurred in the interval between the completion of the survey and the attestation stage; also to test the survey of all plots of which the areas are disputed. When any alterations are found necessary, these are shown on slips of tracing cloth, and are despatched to the Survey Department for correction of the original sheets and for supply of corrected areas. These slips form the *badar* slips referred to in the foregoing paragraph.

It is obvious that it is of the first importance that these surveyor-munsarims should be thoroughly qualified surveyors, and accordingly, at the request of the Settlement Officer, North Bihar, I inspected during December, in company with Mr. R. B. Hughes, Assistant Settlement Officer, the work of some of the surveyor-munsarims and examined their instrumental equipment. The Settlement Officer then issued instructions, based on notes provided by myself, for the entertainment of, and subsequent procedure of, surveyor-munsarims. The main points of these instructions provided for—

(*a*) the examination and grant of a certificate of efficiency by the officers in charge of survey camps, without which surveyor-munsarims at present employed would not be retained or future applicants appointed;

(*b*) supply of proper instrumental equipment through the survey camps, the necessary precautions for frequently testing the same, and, where necessary, the repairs or replacement of same to be attended to by the survey camps;

(*c*) detailed and clear instructions as to how surveyor-munsarims should proceed when testing the survey of a field and making corrections, with special reference to starting their chain measurements from independent and clearly-defined bases; and

(*d*) instruction to officers of the Settlement Department to frequently check the work of their surveyor-munsarims.

It is most satisfactory to the Survey Department to know that all corrections to our maps will be attended to with the same care as is taken in the original survey, and my best thanks are due to the Settlement Officer for the thoroughness with which he has gone into this matter.

Training of Junior Civilians.

36. During the year under report the Settlement Officer, in consultation with myself, drew up rules for the training of junior civilians in survey and settlement work. The full course of training extends over two months,

during which the junior civilians are instructed under the following main heads:—

(*a*) Traverse survey,
(*b*) Cadastral survey and *khanapuri*,
(*c*) Completion of records and compilation of statistics,
(*d*) *Khanapuri* supervision and decision of boundary and interior disputes,
(*e*) Attestation,
(*f*) Office and case work up to final publication, and
(*g*) Computation and recovery of cost.

As regards the survey portion of the programme, the adjustments and use of the theodolite are explained, and the junior civilians have to traverse with the theodolite the boundary of a small imaginary village, then to compute their field work, prove the same mathematically, and plot the result on the 16″=1 mile scale. They then survey, themselves, with the chain and optical offset square a small tract of country, run an independent test-line through the same, and extract by acre comb and compass the field areas thereof. As regards the *khanapuri*, this also was shown them in the field, and they had plenty of practical training under this head subsequently, under the direct supervision of the Settlement Department. As regards the completion of records and compilation of statistics; as none of this sort of work is in progress during the field season, the training under this head could not be of so practical a nature, but all the forms were shown to the junior civilians, and the methods of filling up and checking the same in the survey offices were carefully explained. The following gentlemen, viz., Messrs. Adie, Ramsay, Vernede, and Heycock, went through their course in the Darbhanga district during January and February 1898, and Messrs. Marr, Emslie, Coutts, Maxwell, Kilby, and Jeffries in the Saran district. The last-named attended the traverse class only for a few days, when he was recalled by order of the Commissioner. I was able to attend personally to the training of the first class in the Darbhanga district, but was unable to visit Saran until the second class had closed, but my instructions were carried out by Mr. A. W. Smart, an officer in whom I have full confidence.

Copies of maps and records.

37. In district Saran the sum of Rs. 1,918-0-2 was deposited by indigo-planters and native landlords for copies of maps and records. Of this sum, Rs. 1,275-9-6 have been paid to the copyists, and the balance of Rs. 642-6-8, which represents cost of tracing cloth and forms and the Government fee, has been credited to Government.

In Darbhanga Rs. 2,396-5-7 were deposited, of which Rs. 1,598 has been paid to the copyists, and the balance of Rs. 798-5-7 credited to Government.

In Noakhali the records were completed under the direct supervision of the Settlement Officer, and he has not reported supplying copies of any maps or records. Probably as the survey in Noakhali was only of Government estates, no applications for copies were made.

In Bihar the amount of copying which has to be done is a very considerable addition to our regular work.

The rates for charges for copies of maps and records and for the amounts to be paid to copyists were drawn up by myself, and approved by the Board during the past season.

Chainmen and menial labour.

38. No free labour has been supplied in any of the districts in Bengal in which survey operations were in progress, during the year under report.

Each *amin* is allowed one chainman on fixed pay of Rs. 4 per mensem, but in addition he has to be provided, while employed solely on surveying, with three coolies. In Bihar these coolies were everywhere obtainable at a uniform rate of 1½ annas each per diem. Early in the season the Manager of one of the circles of the Darbhanga Raj addressed me with a view to the payment of 2 annas per diem per coolie in the Darbhanga Raj villages, but on my pointing out that, in such a large area, much extra expense would be entailed, and that if we paid this enhanced rate in the Darbhanga Raj villages,

we would have to increase the rate elsewhere, the Manager's application was withdrawn. In Noakhali *khalasis* were provided for the *amins*. In Bihar special precautions have to be taken to check the coolie bills sent in by Inspectors, to prevent *amins* charging for coolies on days that they were not employed on survey. To do this, it is necessary to ascertain from the *amin's* returns of work the number of days he was actually employed on survey, and to use these figures as a check. If the *amin* returns himself as employed on survey when he was not so employed, his daily average outturn of survey suffers, and he is fined. This check, although necessary, is very laborious, and an extra *muharrir* has been allowed to each camp to deal with coolie bills.

Powers of officers under the Survey Act.

39. Messrs. A. W. Smart and C. S. Kraal, in charge of cadastral sections in Saran and Darbhanga, were gazetted as Assistant Superintendents under the Survey Act [Act V (B. C.) of 1875] in their respective districts, and Mr. H. Dowman, in charge of the Bihar traverse section, as an Assistant Superintendent in the districts of Saran and Darbhanga.

The following tabular statement shows the amounts recovered by fines and process-fee notices:—

District.	Amount by fines.	Amount by process fees.
1	2	3
	Rs. A. P.	Rs. A. P.
Saran	235 0 0	2,026 8 0
Darbhanga	1,801 12 0	1,170 12 0
Total ...	2,036 12 0	3,197 4 0

In Noakhali the Settlement Officer, who had the necessary powers, did not inflict any fines or issue any process-fee notices. In Bihar the same precautions, as during the previous seasons, have been taken to ensure none but richly-deserved fines being inflicted, but amongst the *zamindar* class, more especially, nothing but the infliction of a severe fine seems to have the slightest effect.

Attitude of the inhabitants.

40. The attitude of the inhabitants of both the Saran and Darbhanga districts has not altered from that of the past season. It is with the greatest difficulty that the people can be induced to attend on the *amins* during the survey stage and point out the limits of their fields, but they are eager enough during the *khanapuri* stage, and are very careful of their *parchas*. This, at all events, is a great improvement on the attitude of the people during our first year or two in Bihar, when our operations were treated with extreme apathy from the commencement to the end of the field season.

In Saran there was a little opposition, owing to the survey extending into the Ballia district, but the Collector, on being appealed to, soon put a stop to this. In Darbhanga I have alluded, in the detail report, to the oppression practised by one native *zamindar* on his *raiyats*. In Noakhali no opposition was offered, but the Settlement Officer reports that the people absented themselves at the commencement of the operations.

Recess quarters.

41. The head-quarters of the Bihar survey and the Bihar traverse section recessed, as in previous years, at Mussoorie.

The Saran and Darbhanga cadastral sections recessed at Digha, near Dinapore.

The small establishment of *amins* employed on the Noakhali survey worked under the Settlement Officer during recess at Noakhali.

Agreements with "amins."

42. In 1894 the Board approved of the taking of agreements, under the Indian Stamp Act, with the survey *amins*. This procedure, which has been followed steadily ever since, is necessary (under our system of making the *amin* complete his own papers) in order to retain the field establishments during recess. Notwithstanding these agreements, several *amins* in each camp absconded at the close of the field season, but on their applying for the balance of their contract earnings due them, they were informed that their accounts would be attended to on their paying up the amounts due from them for breach of contract. In addition to this, the descriptions of defaulters are published for the information of the other parties of the Survey of India Department, and I do not think in future seasons we are likely to be much troubled by *amins* refusing to work during the recess season.

"Amin" Establishment.

43. The *amin* establishment employed in Bihar so far has been comprised almost exactly half of foreigners (who must be able to read and write *kaithi* fluently) and half of local men trained during the progress of the operations. The average daily outturns of each class, during the season under report, show that the local *amin* is now quite as accurate and rapid a surveyor as the North-Western Provinces *amin*, and he is generally quicker with the record-writing, which is only to be expected.

Survey of Boundary Disputes in the Tributary Mahals of Orissa.

44. During January 1897 I received, through the Under-Secretary to the Government of Bengal (Political Department), an application from the Superintendent of the Tributary Mahals of Orissa for a surveyor to survey certain boundary disputes. I was unable at that time to depute a suitable man without detriment to the other surveys in progress, and the Superintendent of the Tributary Mahals agreed to wait until the season under report. Surveyor Ram Lakhan Lall, with a trained *tindal* and all necessary instrumental equipment, was despatched to Orissa on the 18th November 1897. The work he had to do was to relay the following boundaries:—(*a*) Nayagarh *cum* Khandpara, 21 linear miles; (*b*) Narsingpur *cum* Khandpara, 1 linear mile, and (*c*) Daspala *cum* Khandpara, 5 linear miles. The surveyor was on deputation, and has, I believe, been employed by the Commissioner on some other necessary surveys as well.

Office of the Superintendent.

45. The sanction of Government has just been obtained to the amalgamation of the two office establishments of the Superintendent of Settlement-Surveys, Bengal, and of the head camp of the Bihar Survey parties, into one office under the head of "Controlling Office." During the field season my office remained at Digha while I was away on tour with a tour clerk. Of the members of my office establishment, the head-clerk, Ramji Lall, and head-accountant, Raghubir Saran, deserve special mention. The work in the Accounts section has been particularly heavy.

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND ON RECORDS OF RIGHTS IN TEMPORARILY-SETTLED TRACTS AND GOVERNMENT ESTATES UNDER SETTLEMENT OF RENTS AND LAND REVENUE.

MINOR SETTLEMENTS.

District Noakhali.

46. The survey work in the Noakhali district, during the year under report, consisted of the cadastral survey and record-writing of *chars* Magdhora and Magdhora Mudafat Amanat Ali, both on the East Coast of Sandip Island.

This survey was originally ordered in Government Notification No. 330L.R., dated 26th May 1896; and although the traverse and topographical surveys were completed during 1896-97, it was found impossible, on account of exceptional difficulties (*vide* page 24 of the Annual Report for 1896-97), to undertake the cadastral survey and *khanapuri*.

Preliminary Arrangements.

47. As the whole area for survey in the Noakhali district comprised, approximately, only 10 square miles, and as none of our survey parties were employed, during the season under report, in Eastern Bengal, I suggested to the Director of Land Records that this small amount of work did not appear to necessitate the deputation of an Assistant of the Survey Department, and I proposed to control the survey establishment directly through the Settlement Officer. Accordingly I arranged with the Settlement Officer that I would provide an experienced Survey Inspector to supervise the detail survey, and also to aid him in the supervision of the record-writing. The Settlement Officer also agreed to arrange for the supply of instruments and forms, and at my request picked six good local *amins* from the establishment employed during the previous season.

I provided the Inspector (Seraj-ul Haq) with the necessary traverse plots, and he reported himself to the Settlement Officer at Noakhali on the 3rd December 1897.

Detail Survey and Record-writing.

48. The following statement shows the area cadastrally surveyed and *khanapuried*:—

Pargana.	Estate.	Cadastral Survey with records.		
		Serial number of block.	Number of fields.	in square miles.
1	2	3	4	5
Sandip ...	Chars Magdhora and Magdhora Mudafat Amanat Ali ...	1	669	2·57
		2	556	0·78
		3	508	1·93
		4	768	1·31
		5	608	1·91
		6	1,145	1·78
	Total ...	6	4,254	10·28

BENGAL SURVEY.

INDEX TO THE CADASTRAL & TOPOGRAPHICAL SURVEYS IN DIST. NOAKHALI.

98. DETACHMENT.

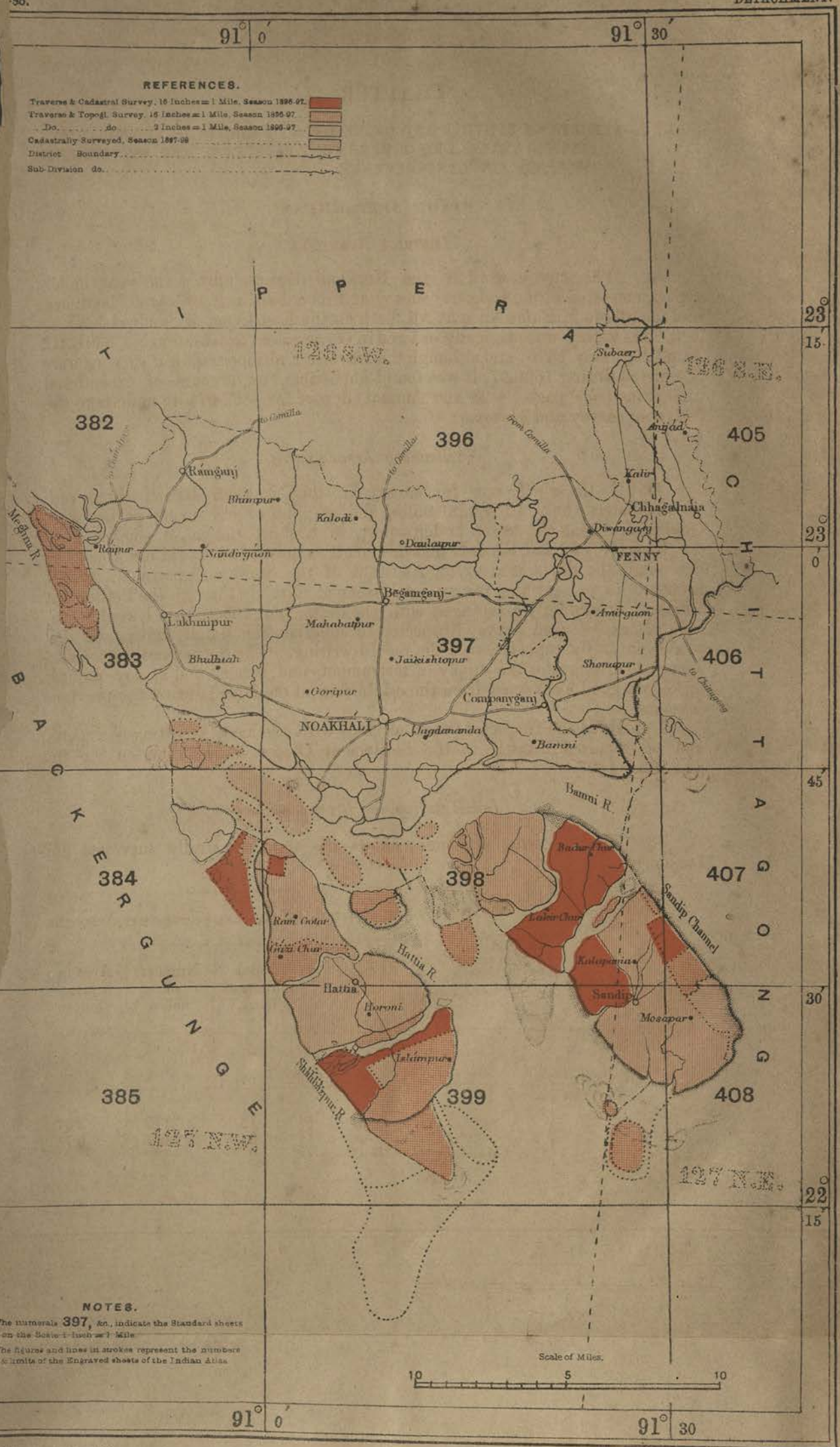


Photo. S. I. O., Calcutta.

No. 530-S. 98.

The area surveyed is comprised on nine sheets on the 16″ scale, and there are no extra sheets for village site surveys, as in Bihar, because the cultivators' houses and homestead lands in Noakhali are scattered and not contained in one compact block, and it has therefore been possible to dispense with intricate surveys of village sites on an enlarged scale.

Char Magdhora Mudafat Amanat Ali, *tauzi* No. 1663, is contained within the exterior boundary of *char* Magdhora, *tauzi* No. 1662, and its lands do not lie in one spot, but are interspersed with the lands of the larger estate. Each of the six blocks, into which these two estates have been subdivided for purposes of record-writing and general convenience, contain a certain number of complete tenancies. In the case of one *Howla* only, which is comprised in scattered lands, was it found necessary to carry the tenure into more than one block, but even in this case the Settlement Officer reports that he has arranged the papers in such a manner that no difficulty will be met with at the attestation stage.

During the survey stage a number of *kiaris* were unnecessarily surveyed, bringing the number of fields up to 6,666, but these were reduced to 4,254 fields, or survey numbers, at the *khanapuri* stage, which total gives an average sized field of 1·54 acres. Field work was nominally commenced on the 9th of December 1897, but owing to the difficulty in locating the positions of the stations of the traverse survey, it was not till near the end of December that work was in full swing. The survey was completed on 23rd January 1898, and the Settlement Officer (with my full approval) decided to start *khanapuri* at once, without waiting for the maps to be tested by "independent *partal.*" This course was adopted, as it was advisable to complete field work early, as stormy weather commences among the islands of the Noakhali district in March, and communications become very difficult, and, moreover, there is generally an outbreak of cholera in March.

The *khanapuri* in the field was completed by 20th February, and the records handed over finally to the Settlement Officer for completion on 31st March.

The accuracy of the survey was checked by 36·88 linear miles of test survey recorded in field books and compared in the field on the board plan, and also by 16·35 linear miles of independent *partal*, run while the maps were locked up by the Settlement Officer. The total amount of test survey is therefore 53·23 linear miles, which gives an average of 5·18 linear miles of test survey to each square mile of detail survey.

The maps were inked up and completed in every respect in the field by the *amins*, under the direct supervision of the Inspector.

The number of entries checked in the field records by the Inspector was 949, which gives an average of 22 per cent. on the whole number of entries. The Settlement Officer also checked the work, and his Assistant checked the entries against 383 plots. The total amount of checking of *khanapuri* is therefore just over 31 per cent.

There was only one boundary dispute, which was disposed of before the commencement of record-writing.

There were 50 disputes relating to entries in the record, of which 11 were disposed of on the spot by the Assistant Settlement Officer, and the balance remain over for the attestation stage.

After the original maps and records had been made over to the Settlement Officer, the area extraction and compilation of the remaining records (*khatians*, *terij*, etc.) were undertaken under the direct supervision of the Settlement Officer by the same *amins* who had done the *khanapuri* in the field.

I supplied the Settlement Officer with the rates to be paid for such work, and the Settlement Officer reports that the establishment was paid accordingly.

On the 7th April 1898, I received the original map, together with field books of the "independent *partals*," which the Settlement Officer had (in accordance with detailed instructions previously supplied by myself) caused to be surveyed, while he held the maps under lock and key. The result of these *partals* showed the work to be first class. The maps were then returned to the Settlement Officer to enable him to take traces thereof. The area extraction, which was also undertaken under the direct supe vision of the

Settlement Officer, was carried out in accordance with detailed instructions supplied by myself, *i.e.*, the area of each plot was extracted twice independently by two separate *amins*, and the means passed by a third party. The Settlement Officer reports that no obstruction to the operations was offered by the inhabitants, although they absented themselves at the commencement of the survey stage, which caused some little delay, and accounts for the unnecessary survey of *kiaris*, but on the Settlement Officer binding a few of the delinquents down to attend by means of *muchalkas*, no further difficulties were experienced.

The usual difficulties as to obtaining provisions and good drinking-water were really the only troubles encountered during this survey.

The estimate for this survey was Rs. 1,200.

The expenditure on survey and field *khanapuri*, including share of cost of my supervision, etc., amounts to Rs. 881, and the Settlement Officer reports that he has expended Rs. 62 on area extraction, completion of records, etc.

The total cost is therefore Rs. 943, which gives a cost rate of Rs. 91·73 per square mile. The Settlement Officer expresses himself as well satisfied with the rapidity with which the Inspector, Seraj-ul Haq, completed the survey and record-writing. The Settlement Officer complained that the Inspector was not acquainted with Bengali, which greatly hampered him. This was unfortunate, but I was unable, at the time, to supply an Inspector with the necessary experience and also acquainted with Bengali, and accordingly suggested that the Inspector be supplied with a Bengali *muharrir*. As regards the Settlement Officer himself, Babu Bhupendra Nath Gupta, I refer to the invaluable assistance he has afforded me in paragraph 83 of this report.

General Remarks.

49. I desire to call the attention of the Board to the procedure adopted in this small survey. The procedure was experimental, but has, I claim, proved an entire success, and I consider that this procedure should, in future, be followed in small surveys of a similar character.

The area for survey was very small, and at a great distance from any other survey operations in progress in the Province, and it would therefore have been very costly to either depute an Assistant Superintendent of Survey for the charge of this work, or to send such an officer, even for a few days, to test the survey on the ground. The establishment employed was supplied by the Survey Department, and the same *amins* who did the detail survey inked up and completed their maps in every respect, then did the *khanapuri*, and during recess extracted their areas and completed all the records and statistical statements necessary for attestation.

The accuracy of the survey is assured, not only by the *partals* carried out during the survey stage by an experienced Inspector of the Survey Department, but more particularly so by the "independent *partals*" carried out while the maps were locked up by the Settlement Officer, under detailed instructions from myself, the original maps and the field books of the *partals* being sent to me for inspection and passing of the same.

The area extraction was also carried out by the Settlement Officer in accordance with detailed instructions supplied by myself.

In such small surveys the amount of time the Settlement Officer has to give up to attending to such matters is not great; and if the Settlement Officer concerned shows an intelligent interest in the survey portion of the work, and carries out exactly the instructions conveyed to him, the result is a survey bearing a professional guarantee of accuracy at a minimum cost.

In this case the Settlement Officer, Babu Bhupendra Nath Gupta, placed himself entirely at my disposal, as if he had been one of my own assistants.

DISTRICT MIDNAPORE.

Majnamutha estate.

50. The test survey and record-writing of eight villages of the Majnamutha estate were completed during the previous year, but an expenditure of

BENGAL SURVEY.

1897-98. **INDEX TO THE CADASTRAL SURVEY IN DISTRICT SARAN** No 4

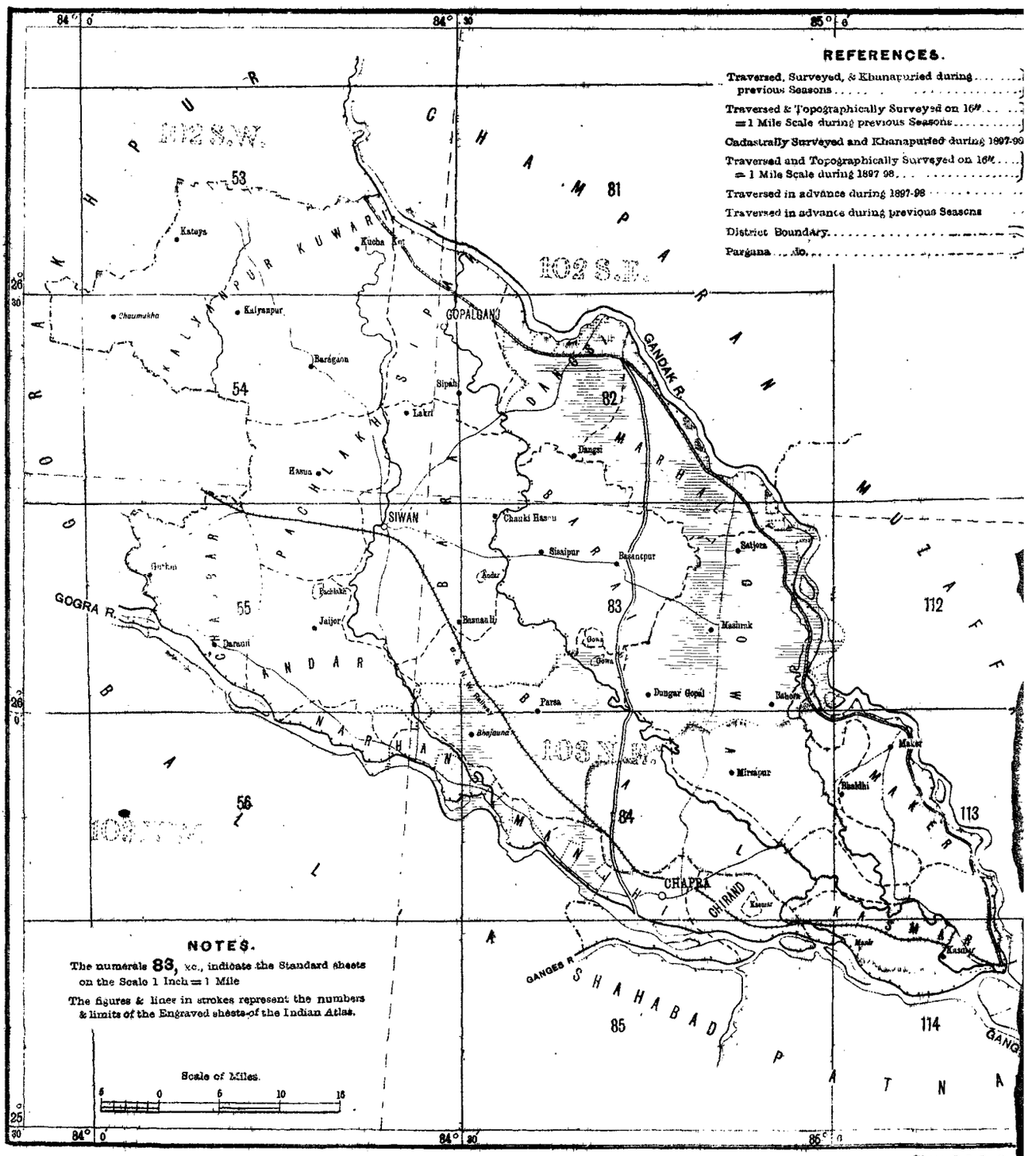


Photo. S. I. O., Ca

No. 528-S

Rs. 462 has been incurred, during the year under report, on completion of traverse computations and completion of records and statistics.

The completed records have all been made over to the district authorities.

PART II.—REPORTS ON SURVEYS AND ON RECORDS OF RIGHTS IN PRIVATE ESTATES.

MAJOR SETTLEMENTS.

District Saran.

Traverse survey.

51. The strength of the North Bihar traverse section, which had to carry on simultaneous operations in districts Saran and Darbhanga, consisted of Mr. H. Dowman in charge, 12 surveyors and sub-surveyors, 10 computers, and 175 menials comprising guardsmen, chainmen, line-cutters, and *khalasis*.

During the field season Mr. C. S. Gasper was also attached to the traverse section, but he was away a great part of the time on the Nipal frontier work. During recess Mr. T. W. Babonau junior) was attached to the section, and the services of Mr. H. T. Hanby were also lent by the Surveyor-General. The section took the field on the 25th October 1897, putting the majority of the surveyors into Saran, as the plots were urgently required for detail survey during the same season, and the remainder into Darbhanga, to commence the survey of the main circuits.

The field work of Saran was practically completed by the end of November and six squads despatched to Darbhanga, but two surveyors were retained to complete some details of work until the end of February 1898.

The following tabular statement shows the area traversed in the Saran district:—

Thana.	Pargana.	Number of villages.	Area in square miles.
1	2	3	4
Manjhi ...	Manjhi and Narhan	42	22·86
Mashrak ...	Goa	34	13·88
	Total ...	76	36·74

This amount of work is exclusive of overlap surveys in the Muzaffarpur and Ballia districts, which are shown in the following table:—

District.	Thana.	Pargana.	Number of villages.	Area in square miles.
1	2	3	4	5
Muzaffarpur ...	Paru	Ratti ...	20	9·79
Ballia ...	Not known ...	Kharid ...	10	14·23
			30	24·02

The overlap survey in district Muzaffarpur was necessary for purposes of connection, and a portion thereof (viz., 15 villages, 5·34 square miles) has been surveyed in detail, as noted in the reports on Muzaffarpur cadastral and topographical surveys. The traverse survey in Ballia is an overlap, but was surveyed as in district Saran, but afterwards decided to be Ballia (*vide* report on Saran topographical surveys). Although the entire area traversed was supposed to be *diara*, some of it was afterwards cadastrally surveyed, and therefore any comparison with the area traversed as *diara* lands and the area subsequently topographically surveyed as *diara* lands is misleading.

The origin of survey in the Saran district was the same as that of last year, viz., the intersection of 26° 15′ 00″ N. Lat. with 84° 30′ 00″ E. Long.

The whole area traversed is contained in seven river circuits, one of which was subdivided into eight sub-circuits. Thus each sub-circuit contains from seven to eight villages. Within the village circuits there are 100 sub-traverses, at an average distance of 30 chains apart.

The total linear miles of new chaining is 294·94, of which 72·01 linear miles are on river circuits, 18·69 linear miles on sub-circuits, 112·13 linear miles on village circuits, and 92·11 linear miles on sub-traverses.

As usual, two chains of unequal lengths, one being the ordinary Gunter's chain of 100 links = 22 yards, and the other a Gunter's chain with 7 links abstracted therefrom, were used for the measurements of all distances on the river and sub-circuits. The results obtained from these independent measurements were compared on the spot by means of a conversion table, and in cases of discrepancy, the distances were immediately re-chained. On the village circuits and interior sub-traverses, only the ordinary Gunter's chain was used. To ensure the accuracy of all chaining, each surveyor's squad, in addition to the ordinary working chains, was supplied with two standard chains. All chains before being made over to the surveyors were tested on the standard laid down at the head-quarters camp of the traverse section by means of the steel standard bars, and the two spare chains were sent in alternately, once a week, to be tested on this standard. The Surveyors had orders to test their working chains daily in the field against their spare standard chains.

The correction applied to the traverses in office was, when the northing was plus 2·14 links per 100 chains, where the southing was plus 2·27 links per 100 chains, where the easting was plus 2·35 links per 100 chains, and where the westing was plus 1·75 links per 100 chains. The angular work was checked by the results of the observations of 13 azimuths. More azimuths were not necessary, as, owing to the nature of the tracts under survey (long narrow strips of country), the bearings of the lines on previous season's work were available to check angular error. The average correction applied to the angular work is +1′ in 18 angles and —1′ in 22 angles on the entire polygons (including old as well as new work) and on the new work alone +1′ in 26 angles and —1′ in 18 angles.

The mean variation of the magnetic needle, computed from the results of the 13 new azimuths, is 2° 02′·19″ east of the true meridian. No stations of the Great Trigonometrical Survey fell within the scope of the season's operations, and therefore no connections with the Great Trigonometrical Survey were possible. The theodolite was set up altogether 1,613 times or, excluding starting and closing stations on traverses previously surveyed, at 1,173 new stations.

The area traversed (although omitted from previous season's traversing as being entirely *diara*) proved to comprise a considerable amount of high land as well as *diara*. In the high lands the usual stones and cylinders were used for marking theodolite stations, but in the tracts obviously subject annually to river action, only pegs were utilized. Of the 1,173 new stations at which the theodolite was set up, 49 have been marked by stones, 482 by cylinders, and the balance of 642 by pegs.

The preliminary demarcation, carried out by the inhabitants, in accordance with the instructions contained in the notices which had previously been distributed to them through the agency of the village *chaukidars*, was found to be satisfactory. In addition, the line-clearers and surveyors were supplied with traces on the 4″=1 mile scale, compiled from the maps of the old Revenue Survey, and this tended to check any great discrepancies between the present traversing and the boundaries according to the old revenue survey.

There were only 11 boundary disputes, but one of these between Saran and Ballia was of considerable magnitude, and was eventually decided (after the cadastral survey) in favour of Ballia. In all cases of disputes, both lines were traversed and temporarily marked by pegs, pending decision of the disputes by the settlement authorities.

The line-clearing squads were all out in the field a fortnight ahead of the surveyors, and consequently there were no delays to the traversing.

There was only one slight delay, owing to the Ballia *zamindars* objecting to the traverse operations extending into their district. This objection was natural enough, but all opposition ceased on the matter being reported to the Collector.

The health of the establishment was excellent throughout the season.

Generally the attitude observed by the inhabitants to the traverse operations was satisfactory, and willing assistance was generally afforded to the line-clearers and surveyors.

The officer in charge reports that he found it unnecessary to inflict any fines or to issue any process fee notices.

The computations were completed in every respect by the middle of January, and the last batch of plots on the 16″ scale was handed over to the cadastral section for detail survey on the 21st January. There are absolutely no arrears.

The traverse *data* of the first season's work in districts Darbhanga, Saran, Champaran, Muzaffarpur, and Gya, which had been handed over to us by other parties, were found to be full of omissions. I had been aware of this for some time, but had been unable to arrange for taking up this arrear work until the current recess season, when the Surveyor-General offered to lend me the services of Mr. H. T. Hanby. Amongst other items, these arrears comprised the plotting of a considerable number of sheets, which had not been completed by the other parties before they were disbanded or transferred from Bengal. The arrears have been very satisfactorily dealt with by Mr. Hanby, aided by Mr. Babonau and computers from the regular strength of the traverse camp, and what little still remains can be attended to without extraneous aid. The services of the officer in charge of the Bihar Traverse Section and of his assistants are alluded to in paragraph 81 of this report.

Of the native establishments, the following are worthy of particular mention:—Head computer Manohar Daji; computers Lalji Sahai, Jogendra Chander Ghosal, Tota Ram, Gopal Sitaram, and Pashupatti Chatterji; surveyors Murli Manohar, Patandin, Piari Lal, and Azimuddin, also vernacular writer Mathura Pershad. The expenditure on the Saran traversing (including Ballia, which is an overlap) has been Rs. 5,510. The resulting cost rate is Rs. 108·04 per square mile.

Cadastral Survey with Records.

52. The Saran Cadastral Section was under the charge of Mr. A. W. Smart, Extra Assistant, 5th grade, who had as his Assistants Mr. E. F. Berkeley, Mr. C. S. Gasper (up to 1st December 1897 only), and Messrs. P. L. Causeley and H. H. Taylor. The native establishment consisted of 3 head-inspectors, 30 inspectors, 294 *amins*, and 294 *muharrirs*, together with the usual office establishment of draftsmen, estimators, etc. This section left its recess quarters at Digha on the 28th October 1897, and commenced field work on the 2nd November. Field work was completed (with the exception of portions of 40 villages which were under water) on the 14th April 1898 and the section returned to its recess quarters at Digha, to proceed with area extraction and completion of records, etc. For the portions of the 40 villages under water, a small establishment was left out in the field until the first week of June, when the entire programme was completed.

The programme in this district, which (in accordance with our lately introduced procedure) was drawn up *thanawar*, provided for the completion of *thanas* Gopalganj, Mashrak, Manjhi, Darauli, and Basantpur, and for an area of about 80 square miles in the north of *thana* Chapra. The entire programme was accomplished, notwithstanding the fact that the number of fields greatly exceeded our expectations, and that the *pattidari* tenures were more intricate and difficult than had been anticipated.

The following tabular statement gives in detail the areas surveyed and *khanapuried*:—

Thana.	Pargana.	Survey and Khanapuri.		
		Villages.	Fields.	Square miles.
1	2	3	4	5
Gopalganj ...	Dangsi ...	88	131,789	73·84
	Marhal ...	115	132,100	81·23
Mashrak ...	Goa ...	3* / 269	358,503	164·16
Chapra ...	Goa ...	63	91,407	37·44
	Bal ...	66	94,503	38·86
	Manjhi ...	7	3,962	1·98
Manjhi ...	Bal ...	188	283,602	115·25
	Manjhi ...	27	25,032	12·81
	Narhan ...	18	17,116	11·40
Darauli ...	Bal ...	27	29,778	13·49
	Narhan ...	5	12,921	4·75
Basantpur ...	Bal ...	1*	158	0·06
	Total ...	4* / 873	1,180,871	555·27

* These are portions of villages.

The portions of villages in the above statement refer to villages cut through by the river *bandh*, and which were therefore only partially surveyed during previous seasons.

The area surveyed is mapped on 996 sheets on the 16″ = 1 mile scale, in addition to which there are 614 sheets containing the surveys on the 64″ = 1 mile scale of village sites, for which there was not sufficient room on the margins of the 16″ plans.

The average size of the field is only 0·30 of an acre, which is the smallest average we have yet reached in Bihar, but as the average size of the field, in the 76 square miles of *thana* Chapra completed to date, works out to only 0·26 of an acre, it seems probable that the field of next season's programme will be still smaller.

In the area surveyed 1,484 linear miles of check survey were run by European officers and "independently," and 1,564 linear miles by Inspectors. The total linear miles of test survey is therefore 3,048, which gives an incidence of 5·49 linear miles of test survey to each square mile of detail survey. In addition to this, the large scale surveys of the village sites were checked by entirely independent resurveys of 315 portions, and by 1,676 chain *partal* lines carried through the main streets.

The number of entries checked in the field records by European officers was 6,866, and by Inspectors 317,834. The total of 324,700 gives an average of 27·5 per cent. on the total number of plots. These figures are quite exclusive of checking done by the Assistant Settlement Officers and *kanungos* of the Settlement Department. The preliminary demarcation, carried out by the inhabitants, was as a rule fairly good. The boundaries of the villages, as surveyed during the season, agree well with those of the revenue survey of 1844-45. In a few cases there are large differences, due to changes in proprietorship, and all such have been shown on the present maps.

There were 383 boundary disputes during the season, all of which were decided by the Settlement Officers. In one case only the file has been returned for revision, and the final decision is still pending.

In the dispute lists 33,648 disputes, relating to the entries in the *khasra* against 89,519 fields, were recorded, of which 20,741 have been disposed of by the Settlement Department, and the balance of 12,907 remains over for the

attestation stage. As in previous seasons, there was considerable delay in the receipt of copies of the Collectorate registers, many of which were not received until long after the completion of the *khanapuri* of the village concerned. For 140 villages no registers were ever received. The *khewats*, or records of proprietary rights of landlords and tenure-holders, were prepared entirely by the Survey Inspectors and checked by the Settlement and Survey Officers. The usual comparison with the Collectorate registers was carried out, and on our *khewats* all differences showing unrecorded mutations have been entered in red. In eight villages no *khewats* have been compiled under the orders of the Settlement Officer, because, of these, in four cases the proprietors claimed to be *lakhirajdars*, of which they could not provide sufficient proof, and in the remaining four cases the proprietors could not be traced at all. The Settlement Department will deal with these eight cases at the attestation stage. The amount of *pattidari* tenures met with during the season has been very great. With the exception of a few *wahid* villages, all the remainder, in the area under survey, were *pattidari*, and in the majority of these the tenures were extremely intricate. Mr. Smart reports that in one village containing only 123 field numbers, there are 34 *pattis*. In another case one *tauzi* contains 94 *pattis*.

The tract of country under survey stretches right across the centre of the district, in the shape of a crescent, touching the Gandak river on the north and the Gogra on the south. It is open, flat, richly cultivated, and particularly well supplied with roads, which latter item was particularly fortunate, as, owing to the awkward shape of the area to be supervised, good communications were of great importance.

The health of the establishments during the field season was excellent, but immediately after returning to recess quarters, there were nine cases of cholera, of which two proved fatal.

The inhabitants of the district displayed their usual attitude towards the survey, viz., complete indifference during the survey stage, but careful attendance during the *khanapuri* stage, and great keenness to obtain their *parchas*.

It was found necessary, in order to obtain attendance, to issue 2,702 process-notices, each bearing a court-fee stamp to the value of 12 annas. Of these, 1,539 notices were issued on landlords and tenure-holders, and the balance of 1,163 was issued on *raiyats*. In addition to this, the sum of Rs. 235 was inflicted as fines in cases of repeated non-attendance and failure to comply with special notices previously issued. The amount of the fines inflicted, during the season under report, is only one-fifth of the fines (considering the relative areas surveyed) inflicted during the previous season, which points to an improvement in attendance. The rules for record-writing were practically the same as for previous seasons. As there was a large stock in hand of the ordinary "Triplicate *Parcha*" forms, these were used until near the close of the season when the new "Triplicate *Parcha*" form, with area slips attached thereto, were brought into use. As the old "Triplicate *Parcha*" forms had no area slips attached thereto, the areas were written up on obsolete forms (of which there was also a large stock) for distribution to landlords and *raiyats*.

The only exceptional difficulties encountered were—(*a*) very intricate *pattidari* tenures, (*b*) non-attendance on the part of the landlords and *birtdars* which delayed the compilation of the *khewats*, and consequently delayed the commencement of the *khanapuri* of the *khasra*, and (*c*) presence of water in portions of 40 villages, which entailed field work being carried on into June.

Eleven large indigo concerns, with ten out factories, fell within the scope of the season's operations. The sum of Rs. 1,918-0-2 has been deposited by the managers of indigo factories, and by zamindars for copies of maps and records. Of this sum, Rs. 1,275-9-6 represents the remuneration due to the copyists, and the balance of Rs. 642-6-8 is the Government fee, which has been duly credited to Government.

Traces of the maps and the original records of the entire season's work (with the exception of a few very large villages containing several thousands of plots each, which could not be completed in time) have already been made over by instalments to the Settlement Department. The few exceptions will be completed and handed over by the 1st October.

The original sheets and field-area statements will be retained by the section to enable it to deal with the *badars* to be received from the attestation stage.

Mr. H. Coupland, I.C.S., relieved Mr. M. F. Gauntlett early in the season as Assistant Settlement Officer in charge of the district. He had as his two assistants, to aid him in dealing with boundary disputes and in supervising the *khanapuri*, Mahomed Abdul Momen and Babu Surendra Nath Chakravarti. In the middle of February two *kanungos* were appointed to assist in dealing with interior disputes.

In paragraph 13 of this report I have referred to the procedure adopted in dealing with the district boundary, as laid down by Government Notification No. 2598, dated 27th September 1888.

The services of the Survey Officers employed in Saran are referred to in paragraph 81 of this report.

Of the native establishment, the following are worthy of particular mention :—

Head Inspectors Laljimall and Ramzan Ali, Inspectors Waris Ali, Jagdam Sahai, and Basharat Ali, Accountant Harakh Narain, Writer Ishri Pershad, Head Draftsman Imam Ali, Head Estimator Abdul Wahid, and Record-keeper Ahmed Ali.

The total expenditure on the cadastral survey in district Saran during the year under report was Rs. 1,05,552, of which Rs. 47,670 are debitable to detail survey, completion of maps, areas and traces, and the balance of Rs. 57,882 to record-writing, completion of records, and compilation of statistics.

The resulting cost rates are—For detail survey, etc., Rs. 85·89 per square mile, and for record-writing, etc., Rs. 104·29 per square mile. No free coolie labour was supplied, and the expenditure on coolies was Rs. 5,921. This sum is included in the expenditure on detail survey, but represents in itself, without any addition for share of supervision, etc., a cost rate of Rs. 10·67 per square mile.

Topographical Survey.

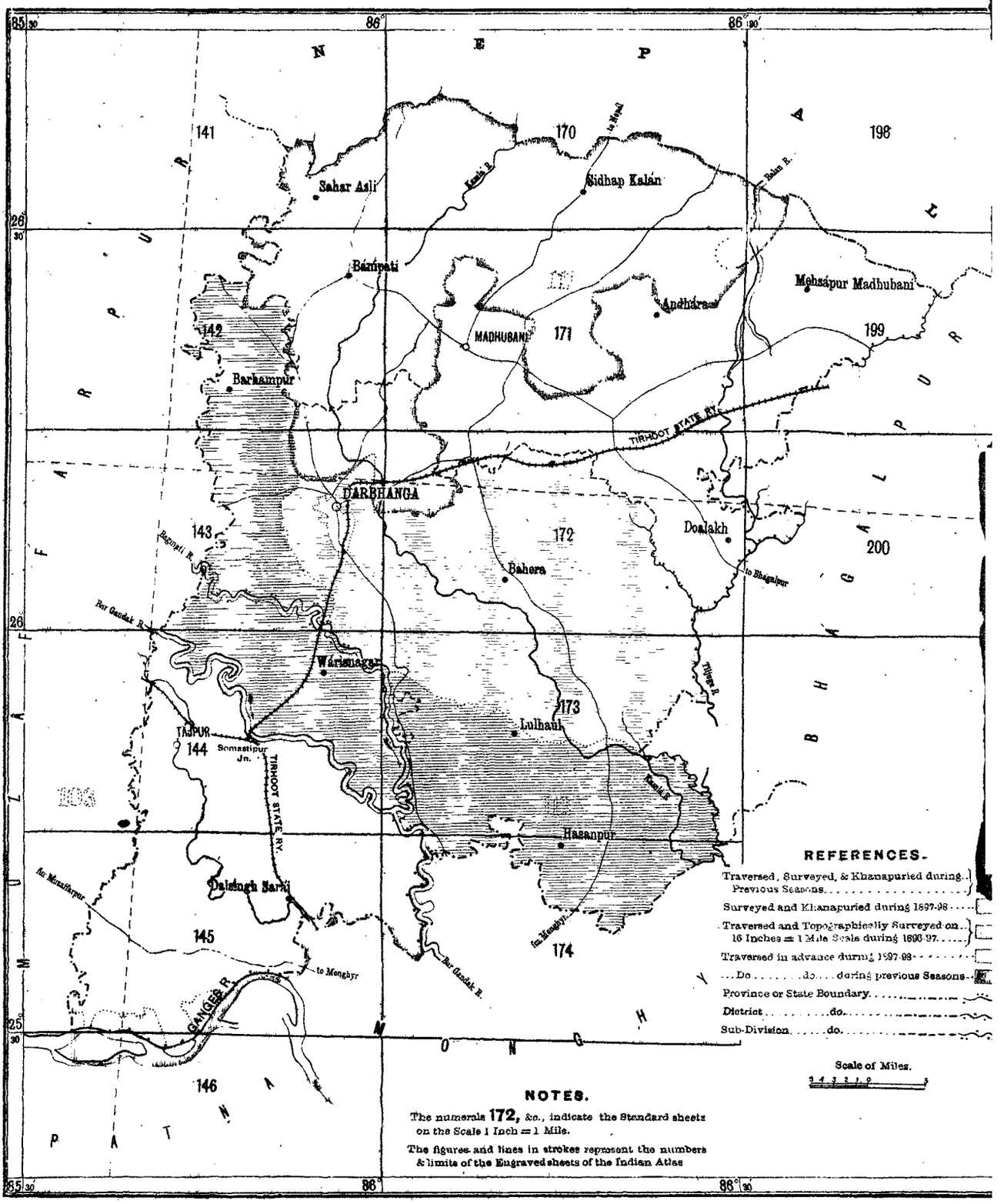
53. In accordance with the rules decided on during the previous season (*vide* paragraph 13 of Annual Report for 1896-97), the topographical survey of a number of complete villages and portions of others, lying within the *diara* tracts of the Gandak and Gogra rivers, was undertaken by the Saran Cadastral Section.

The following statement shows the outturn accomplished:—

District.	Thana.	Pargana.	Topographical Survey, 16″ scale.	
			Villages.	Square miles.
1	2	3	4	5
Saran ...	Gopalganj ...	Dangsi ...	5 portions	1·60
		Marhal ...	5 do.	0·88
	Mashrak ...	Goa ...	17 entire	6·65
	Manjhi ...	Manjhi ...	3 do.	1·62
		Narhan ...	1 do.	2·47
	Total Saran ...		10 portions 21 entire	13·22
Ballia ..	...	Kharid ...	10 portions	14·23
	Grand Total ...		20 portions 21 entire	27·45

BENGAL SURVEY.

1897-98. **INDEX TO THE CADASTRAL SURVEY IN DISTRICT DARBHANGA.** No. 4 PAR



Reg. No. 317, S. I. D.—Dec. 98.—1,050.

Photo. S. I. O., Cal

No. 527-S.

The portions of ten villages, covering an area of 14·23 square miles, shown in above statement as belonging to district Ballia of the North-West Provinces, were originally surveyed as in thana Manjhi of district Saran, but were afterwards allotted to Ballia, in decision of a boundary dispute.

There were altogether 14 boundary disputes, including the above-mentioned dispute with Ballia. In the Gandak river *diara*, the boundaries with Muzaffarpur were largely disputed, but this was principally due to the disputed tracts consisting chiefly of sand and water, and the true boundaries being therefore unknown to the parties concerned.

This survey is mapped on 46 sheets on the 16″ scale. The village sites were surveyed in blocks in their true positions on the plan, and there are therefore no marginal enlargements of village sites.

As during the previous season, all topographical items of importance and suitable for reduction for the standard maps have been accurately surveyed.

This survey has been tested by 44 linear miles of *partal* run by the European officers and "independently," and by 31 linear miles of *partal* by Inspectors. The total of 75 gives an incidence of 2·78 linear miles of test survey to each square mile of topographical survey.

The 14·23 square miles of survey in district Ballia will be useful as an "overlap" in compiling the standard sheets.

The total expenditure has been Rs. 725, which gives a cost rate of Rs. 26·36 per square mile. The expenditure on coolie-hire, which is included in the total expenditure, was Rs. 87, which represents Rs. 3·22 per square mile.

District Darbhanga.

Traverse Survey.

54. The North Bihar Traverse Section (strength as noted under the head of Saran traverse) commenced its programme in the Darbhanga district simultaneously with its programme in district Saran, but it was not until December 1897, on the finishing up of the Saran work, that the Darbhanga programme can be said to have been fairly started. The following statement shows the area traversed :—

Thana.	Pargana.	Number of villages.	Area in square miles.
1	2	3	4
Darbhanga ... } Bahera ... }	Contained in 30 scattered parganas.	410 501	149·68 447·99
	Total ...	911	597·67

The traverse section completed the above outturn by 20th April, and retired to its recess quarters at Mussoorie, where office was opened on 3rd May 1898.

The area surveyed is comprised in three main circuits, containing 40 sub-circuits, but 32 of the villages included in the outturn are exterior to these main circuits, and were surveyed to complete omissions in certain sub-circuits of previous season's work. These 32 villages were purposely omitted from previous season's programmes, as they are Darbhanga Raj villages, which, at that time, were not for survey. Each sub-circuit covers, on an average, 15 square miles, and comprises 22 villages. Within the village circuits there are 1,056 sub-traverses, at an average distance of 30 chains apart.

The origin of survey was the same as that of previous seasons, viz., the intersection of 26° 00′ 00″ N. Lat. with 86° 00′ 00″ E. Long. The aggregate linear miles of new chaining is 2,616·71, of which 130·25 are on main circuits, 373·01 on sub-circuits, 36·60 on *pardas* (minor sub-circuits), 1005·27 on village circuits, and 1071·58 on subtraverses.

Two chains of unequal lengths were used on main and sub-circuits and on *pardas*. On village circuits and sub-traverses only the Gunter's chain was used. Exactly the same precautions, to ensure correct chaining, were exercised in this district, as described in the report on Saran traverse survey. The correction applied to the chaining was as follows:—

Where the Northing is plus	...	...	0·28 links per 100 chains.	
Ditto Southing	„	...	..	1·49 ditto.
Ditto Easting	„	...	...	2·35 ditto.
Ditto Westing	„	...	...	2·87 ditto.

The theodolite was set up 18,755 times, or, excluding commencing and closing stations, at 14,855 new stations. Of these 14,855 new stations, 1,538 trijunctions have been marked by stones, 12,612 points, on the village circuits and sub-traverses, by cylinders, and the remaining 705 stations, which were on disputed lines, by pegs. To check the angular work, azimuths were observed at 127 stations on the main and sub-circuits, at an average distance of 20 stations apart.

The correction applied to the angular work is on the entire polygons +1′ in 23 angles and —1′ in 22 angles, and on the new work alone +1′ in 37 angles and—1′ in 32 angles. The mean variation of the magnetic needle, computed from the results of the 127 astronomical observations for azimuth, is 2° 08′ 24″ east of the true meridian.

Four Tower stations of the North Parasnath Meridional series of the Great Trigonometrical Survey have been connected with. A comparison of the direct distances by the Great Trigonometrical Survey and by the traverses is not possible at present, as the traverse *data* are with the cadastral camp for the purpose of entry of offsets. The comparison will, however, be made on taking the field and the results supplied, as usual, to the Surveyor-General's office.

At the close of the field season, a stock of 400 stones and 1,000 cylinders was found to be in hand. These have been collected from last season's centres, and deposited at convenient centres for utilization in the coming season's programme.

The demarcation, undertaken beforehand by the inhabitants, was found satisfactory. Here, as in Saran, the line-clearers and surveyors were supplied with traces from the old revenue survey maps to aid them in checking the demarcation.

There was no difficulty in dealing with the inhabitants, who, as a rule, freely accorded all necessary assistance. No fines were inflicted, nor any process-fee notices issued. Only seven special notices (bearing no service fee) were issued.

The line-clearing squads were kept well ahead of the surveyors, who were thus never delayed for want of previously prepared stations.

The health of the establishment was excellent. The computations have been completed during recess in every respect. The plots of the whole area for detail survey next season have all been despatched to the cadastral section concerned; also the universal theorem areas and the traces on the 4″ scale have all been completed and despatched to the cadastral camps, and there are now absolutely no arrears of any description. The expenditure during the year under report was Rs. 22,135, of which Rs. 1,461 are debitable to marking of stations, and the balance of Rs. 20,674 to traversing. The resulting cost rates are Rs. 2·44 per square mile for marking stations, and Rs. 34·57 per square mile for traversing.

Cadastral Survey with records.

55. The Darbhanga Cadastral Section was under the charge of Mr. C. S. Kraal, Extra Assistant Superintendent, 6th grade, who had as his assistants Messrs. C. G. Lee and T. W. Babonau and Babu Nilmoni Chatterji. During the recess season, on the transfer of Mr. C. G. Lee to the Siamese Government and of Mr. T. W. Babonau to the Traverse section, two supervisors (Messrs. A. E. LeFranc and W. Babonau) were engaged.

The native establishment consisted of 4 Head Inspectors, 35 Inspectors, 350 *amins*, and 350 *muharrirs*, together with the usual office establishment of draftsmen, estimators, etc. The section left its recess quarters for the field on the

28th of October 1897, and returned, on completion of its programme, to recess quarters on the 26th April 1898. A small establishment, under Babu Nilmoni Chatterji, being left out until 9th May to revise *khanapuri* in villages belonging to Babu Ganeshwar Parshad Singh, and also a small establishment under a Head Inspector to complete the *khanapuri* of a few very large villages.

The programme, which had been compiled *thanawar*, provided for the completion of *thanas* Roserah and Warisnagar, and also for an area of about 187 square miles of *thana* Darbhanga.

The entire programme has been accomplished, and the following statement shows the outturn :—

Thana.	Pargana.	Survey and Khanapuri.		
		Villages.	Fields.	Square miles.
1	2	3	4	5
Roserah	Ahilwara	1	522	0·49
	Ahis	3	480	0·32
	Badeh Bhusari	9	4,578	2·43
	Benuan	25	29,352	41·07
	Chakmari	21	44,634	30·43
	Hamidpur	21	31,487	18·39
	Hirni	62	47,623	36·20
	Jhakhalpur	56	76,590	49·63
	Jakhar	38	38,658	29·43
	Kasma	22	30,888	19·18
	Padri	115	99,185	79·13
	Saraisa	1	380	0·42
	Tarson	42	43,890	40·27
Darbhanga	Barail	16	11,930	5·72
	Bharwara	117	204,899	105·40
	Farakhpur	8	1,015	0·52
	Jahangirabad	20	12,669	7·72
	Jakhar	2	1,402	1·05
	Nanpur	4	22,618	11·58
	Pachimbhigo	8	2,452	1·79
	Sarai Hamid	1	5,388	4·27
	Ramchand	36	30,706	25·37
	Shahjahanpur	34	34,535	19·89
	Tirsath	8	8,446	4·42
Warisnagar	Barail	43	29,371	20·13
	Chakmani	1	271	0·11
	Jahangirabad	4	2,958	1·98
	Jakhar	48	60,635	49·22
	Kasma	194	216,062	120·39
	Kharsand	1	5,146	4·71
	Shahjahanpur	1	278	0·11
Bahera	Ahilwar	1	33	0·09
	Ughara	1	942	0·35
	Jakhar	1	785	0·33
	Total	965	1,100,808	73·254

The three villages of *thana* Bahera, at foot of the list, were surveyed, as they are detached villages lying within *thana* Roserah.

The area surveyed is mapped on 1,298 sheets on the 16″ scale, and, in addition, there are 640 sheets containing the surveys on the 64″ scale of the village sites.

The average size of the field is 0·42 of an acre. The detail survey was checked by 1,259 linear miles of test survey run by the Survey Officers and

"independently," and by 1,918 linear miles of test survey by Inspectors. The total of 3,177 gives an incidence of 4·34 linear miles of test survey to each square mile of detail.

To test the large scale village site surveys, 603 blocks were independently resurveyed, and also 1,690 *partal* lines were run through the main streets and alleys. The number of entries checked in the field records by Survey Officers was 10,105 and by Inspectors 276,103, or a total of 286,208, which gives an average of 26 per cent. on the total number of plots. These figures are exclusive of the checking done by officers of the Settlement Department. There were altogether 428 boundary disputes, all of which have been decided, with the exception of two, still in the hands of the Settlement Department. There was some little delay in deciding the boundary disputes during the field season, and several, owing to a mistake in the Survey office, were not made over to the Settlement Department until the recess season had commenced. Suitable arrangements have been made to prevent such a mistake occurring again. There were 41,500 disputes, affecting entries against 58,433 plots in the records. All these, with the exception of 4,987 plots, have been decided, and the records completed in accordance with the decisions. Four *kanungos* were appointed by the Settlement Department from the end of December 1897 to attend to these interior disputes, and the result has been most satisfactory, as a comparison with the figures of the preceding season will show. During 1896-97 there were 57,968 disputed entries, of which only 15,434 were decided, and consequently the entries against no less than 42,534 plots were left blank until the disputes could be decided at the attestation stage.

The demarcation carried out beforehand by the inhabitants is reported to have been found fairly good. The villages, according to the present survey, agree well with the old revenue survey *mauzas*. There were a few exceptions in tracts subject to inundation, but all differences have been clearly marked.

The copies of the Collectorate registers were made on the *khewat* forms themselves at the instance of Mr. R. B. Hughes, Assistant Settlement Officer. This procedure greatly facilitated the work of the Inspectors who had to compile the *khewats* on the ground. The blank forms for the copies were supplied to the Collectorate early in the foregoing recess season, but, notwithstanding, there was some little delay in receiving the copies of the registers.

The difficulties of record-writing were much increased by the amount and intricacy of the *pattidari* tenures met with. Out of the 965 villages surveyed, 605 were *pattidari*. The average of 10 villages, taken haphazard, gives each village 70 *tauzis* and 168 *pattis*.

The tract of country under survey during the year under report was (as in Saran) in the form of a crescent stretching right across the district from Muzaffarpur on the west to Monghyr and Bhagalpur on the south and east. The country is flat and lowlying, and intersected by several rivers, viz., the Bagmati, Kamla, Karai, and others.

In order to guard against encroachments, traces showing in detail the boundaries of the Muzaffarpur district according to the previous survey of 1893-94-95 were made over to the Inspectors concerned. There were six large differences, which have been referred to the Settlement Department.

The general health of the establishment during both field and recess seasons was fairly good.

The attitude towards the survey operations displayed by the inhabitants was exactly the same as that displayed in the Saran district, *i.e.*, indifference during the survey stage, coupled with great keenness during the *khanapuri* stage and anxiety to obtain their *parcha* slips.

The native *maliks* in general were a source of considerable trouble, and it was difficult to get hold of them.

It was necessary to issue 1,561 *talibana* notices, each bearing a twelve-anna court-fee stamp. The total value of these stamps amounted to Rs. 1,170-12. In addition to this, the sum of Rs. 1,801-12 was levied in fines, of which Rs. 1,064 were realized at once, and certificates for the balance have been sent to the Collector. Fines have only been inflicted in aggravated cases of non-attendance and refusal to obey special notices, and in a great many cases not only on the reports of the Inspectors supported by the *patwari's* statements, but also on the reports of the European inspecting officers.

One native *malik*, by name Babu Ganeshwar Pershad Singh, who owns a large number of villages, and has shares in many others, all situated to the south-east of the Roserah *thana*, was particularly obstructive. During March it was discovered that this *malik*, through his agents, had caused false entries to be made in the records. The Settlement Officer decided that it would be necessary to revise the *khanapuri* in all the villages concerned, and that the Babu should pay for all the revisions. A Special Assistant Settlement Officer was deputed to attend to the revisions, and on the side of the Survey Department Babu Nilmoni Chatterji was appointed with a picked establishment. On the 29th April work was reported to be at a standstill owing to the action of the Babu's agents, who were still intimidating the *raiyats;* and as the season was so far advanced, the revision was, with the concurrence of the Settlement Officer, discontinued. Next season a picked establishment of one Survey Inspector and ten *amins* will be placed under the immediate supervision of an Assistant Settlement Officer to revise the *khanapuri* of 25 villages, entirely the property of the Babu, containing 24,425 fields and covering an area of 28 square miles. In each of these 25 villages there are at present more than 50 *bakasht* entries. The cost of this revision will be met by the proprietor under arrangements made with the Settlement Officer.

The *khanapuri* rules were practically the same as during the previous season. The new "Triplicate *Parcha*" forms with slips for entry of areas to be distributed to landlords and *raiyats* were used throughout the season.

Mr. R. B. Hughes, I.C.S., was the Assistant Settlement Officer in charge until early in March, when on his transfer to the Political Department, Mr. J. Kerr, I.C.S., from Champaran took his place. The Assistant Settlement Officers appointed to aid in the supervision of the *khanapuri* were Babus Ananda Charan Das, Atul Chandar Kerr, Maulvi Ashfaq Hosein, and Said Abul Fazil. The first named was employed in the area under survey throughout the season, and the remainder for shorter periods. The difficulties met with were the usual ones, *i.e.*, dilatoriness in attendance on the part of both *maliks* and *raiyats* during the survey stage and the intricate *pattidari* tenures, to which reference has been already made. The work of the section was much increased by the necessity for revision of the record-writing in Babu Ganeshwar Pershad Singh's villages.

The lands of 13 large indigo factories and of 5 out-factories fell within the scope of the season's operations.

The sum of Rs. 2,396-5-7 was deposited by the managers of indigo factories and by zamindars for copies of maps and records. Of this amount, Rs. 1,598 has been paid to the copyists, and the balance of Rs. 798-5-7, which represents the cost of tracing cloth, forms and Government fee, has been credited to Government. The traces and original records of the whole season's work (with the exception of a few very large villages, which will follow during the first week of October) have already been made over, by instalments, to the Settlement Department.

The original field sheets and area statements will be retained in order to deal with the *badars* to be received from attestation. During the year under report, a small establishment, consisting of three draftsmen and two estimators, was attached to the section to deal with the *badars* of 1896-97. This procedure was found to be most successful, for out of 829 *badar* slips received from the attestation officers, 825 have been disposed of, and the original cadastral maps have now been returned to the Bengal Drawing Office at Calcutta to enable the standard mapping to be proceeded with.

The services of the survey officers of the Darbhanga Cadastral Section are referred to in paragraph 81 of this report.

Of the native establishment, the following are worthy of particular mention :—

Draftsman Abdul Majid, computer Isar Chander Dey, and sub-surveyor Fakruddin.

The total expenditure during the year under report has been Rs. 1,12,286, of which Rs. 54,875 are debitable to detail survey, completion of maps, areas and traces, and the balance of Rs. 57,411 to record-writing, completion of records and statistics.

The resulting cost rates are—For detail survey, etc., Rs. 74·86 per square mile, and for record-writing, etc., Rs. 78·32 per square mile.

No free cooly labour was supplied, and the expenditure under this head alone (exclusive of any shares for supervision, etc.) was Rs. 8,455, which in itself represents a cost rate of Rs. 11·55 per square mile.

District Muzaffarpur.

Traverse Survey.

56. During the progress of the traverse survey of thana Mashrak, in district Saran, it was ascertained that an adjoining tract of 5·34 square miles, contained in portions of 15 villages, had been omitted from the survey of the Muzaffarpur district in 1893-94. This omission was owing to the river Gandak, which forms the district boundary, having in 1893-94 changed its course and cut into the Muzaffarpur district, thus temporarily placing this area of 5·34 square miles in the Saran district. During the year under report the river had, however, moved back to its old channel, and the possession of this small tract of country was not disputed by the inhabitants of Saran, and consequently it had to be surveyed as in Muzaffarpur. For purposes of connection with old work, it was found necessary to traverse an overlap of 4·45 square miles, contained in five other villages of Muzaffarpur, thus bringing the total of traversing in that district during the season under report to 20 villages (mostly portions only), covering an area of 9·79 square miles. For the purpose of arriving at statistical results, all figures for chaining, angular work, etc., of this small area have been included in the statistical results for Saran traversing, and will be found in the report for Saran traverse.

The cost has been Rs. 1,083. The resulting cost rate per square mile is Rs. 108·30 for marking stations and for traversing.

Cadastral Survey with Records.

57. Of the area of district Muzaffarpur omitted from the survey of 1893-94, it was decided to cadastrally survey portions of five villages.

The following table shows the details :—

Thana.	Pargana.	Villages.	Fields.	Square miles.
1	2	3	4	5
Paru	Ratti ...	5 portions	250	1·46

The survey is contained on 5 sheets on the 16″ scale.

The average size of the field is 3·72 acres. There are 5 linear miles of "independent" *partal* and 3 miles by Inspectors. The total of 8 linear miles gives an incidence of 5·48 linear miles of test survey per square mile of detail survey.

The number of entries checked in the records was 60, which gives a percentage of 24. There were 8 boundary disputes (inclusive of disputes in the Muzaffarpur topographical area), all of which have been settled, with the exception of one, which has been returned for revision. The expenditure has been Rs. 247, and the resulting cost rates per square mile are as follows:—For cadastral survey, completion of map, areas and traces, Rs. 74; and for record-writing and completion of records and statistics, Rs. 90·66. The expenditure on coolies has been Rs. 14, which is included in the total for cadastral survey, but represents in itself a cost rate of Rs. 9·6 per square mile.

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT MUZAFFARPUR.

1897-98. No. 4 PARTY.

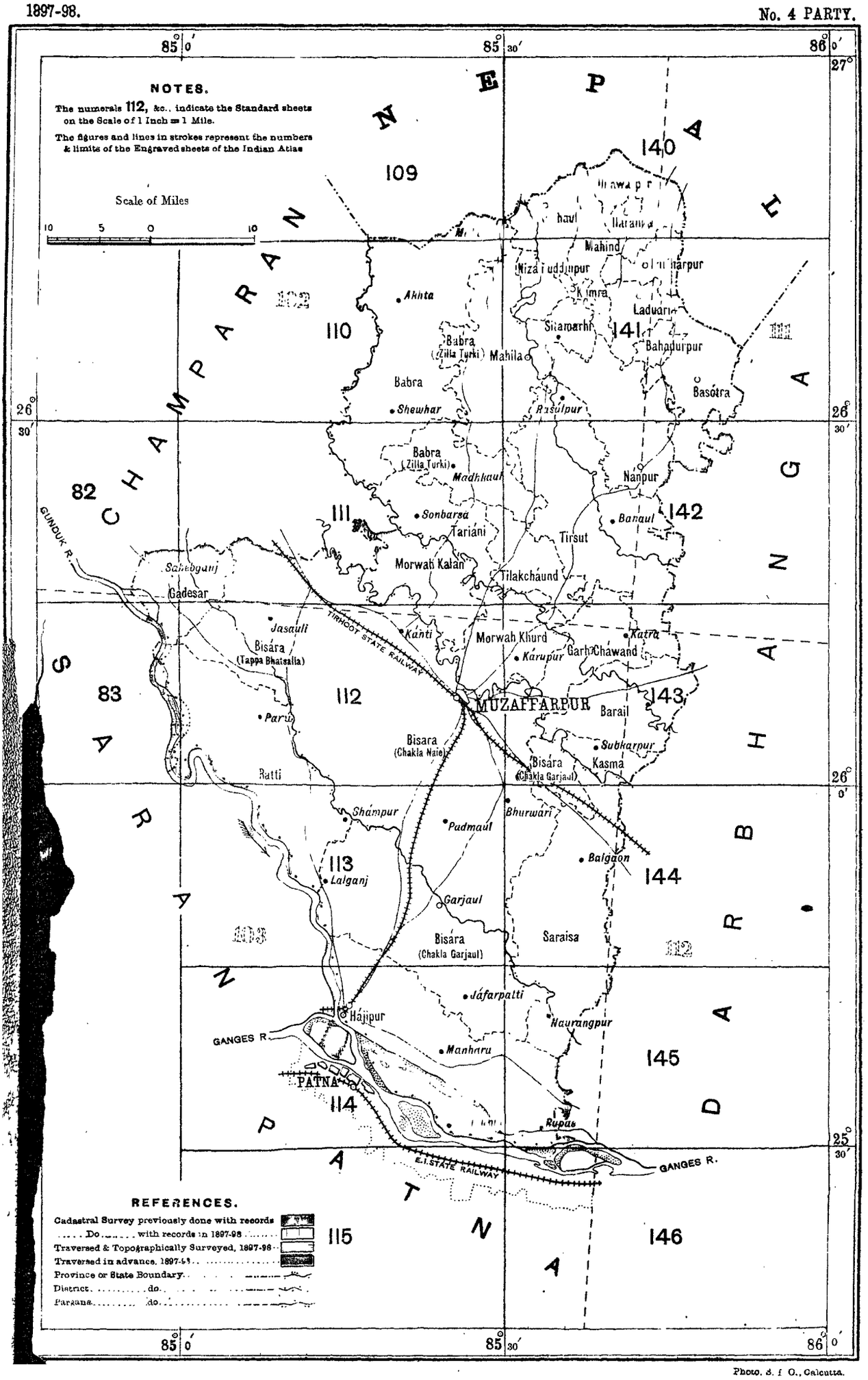


Photo. S. I. O., Calcutta.

No. 529-S. 98.

Topographical Survey.

58. The balance of the area of district Muzaffarpur omitted from the survey of 1893-94 has been topographically surveyed. The following table shows the outturn:—

Thana.	Pargana.	Villages.	Square miles.
1	2	3	4
Paru	Ratti ...	10 portions	3·88

This topographical survey, which is on the 16″ scale and is mapped on 13 sheets, was carried out on exactly the same lines as described under the head of Saran Topographical.

The survey has been tested by 14 linear miles of "independent" *partal* and by 7 linear miles of *partal* by Inspectors. The total of 21 linear miles gives an incidence of 5·4 linear miles of test survey to each square mile of detail survey.

These portions of 10 villages belong to villages cadastrally surveyed in 1893-94; but as the Gandak river (the district boundary) has entirely changed its course since 1893-94, it will be extremely difficult, if not impossible, to fit the lately surveyed portions on to their parent villages, and as, moreover, the portions of 1893-94 have been cadastrally surveyed and attested, it is probable that the lately surveyed portions will have to be completed next season in cadastral survey with records. The total expenditure has been Rs. 115, which gives a cost rate of Rs. 28·75 per square mile. The expenditure on coolie line has been Rs. 13, or Rs. 3·35 per square mile.

District Champaran.

59. Although the traverse and cadastral surveys in district Champaran were completed in 1895-96, the traverse records required completion in a few minor respects and final examination before despatch to the Survey of India Offices at Calcutta, and the expenditure on this work during the year under report has been Rs. 103.

PART III.—REPORTS ON SURVEY AND ON RECORDS OF RIGHTS IN WARDS' ESTATES.

District Gaya.

Tikari Ward's Estates.

60. The field work, in connection with the survey of the Tikari ward's estates in district Gaya, was completed in 1894-95, but the traverse records of season 1892-93, handed over to us by No. 2 Party, were in a very incomplete state. They have been brought up to date in every respect and finally examined during the year under report at an expenditure of Rs. 276.

District Monghyr.

Narhan Ward's Estates.

61. The traverse records of this survey also required final examination before despatch to Calcutta. The expenditure under this head has been Rs. 38.

PART IV.—REPORTS ON MISCELLANEOUS SURVEY.

DISTRICT DARBHANGA.

Somastipur Town Survey.

62. The town of Somastipur really fell within the scope of the survey operations in the Darbhanga district of 1896-97, but as it was the intention of Government to convert Somastipur town, together with adjoining lands, into a municipality, from the 1st January 1897 (*vide* Government Notification No. 469T.M., dated 14th September 1896), I directed that the survey should only extend to the limits of the *raiyati* lands included within the proposed municipal limits, and addressed the Subdivisional Officer with a view to ascertaining whether a large scale survey of the urban area would be required, and whether the Municipal Board would pay for the same. I was informed that, although such a survey would be required, funds were not forthcoming, and the survey was therefore postponed until the season under report. Sanction of the Board to this survey was officially obtained on the 31st January 1898 (*vide* Board's letter No. 10A., of that date).

The Municipality is contained within the following seven villages, viz., Somastipur, Dharampur, Bangra, Magardihi, Bahadurpur, Kashipur, and Hasanpur. Of these, the entire villages of Somastipur and Bangra are contained within the municipal limits, and the balance of the area of the Municipality is made up by portions of the remaining five villages. The entire area included within the exterior boundaries of the Municipality is 1,117·64 acres, or 1·75 square miles, but within this lie the railway station and other lands belonging to the Bengal and North-Western Railway Company, which are excluded by Government from the provisions of the Municipal Act. The area of these railway lands is 105·50 acres, or 0·16 of a square mile. Therefore, strictly speaking, the area of the Municipality is 1,012·14 acres = 1·59 square miles. Of this 1·59 square miles, 1·27 square miles are *raiyati* lands, and the balance of 0·32 of a square mile is purely town area. During 1896-97 *raiyati* lands, covering an area of 1·23 square miles, had been surveyed and *khanapuried* in connection with our ordinary proceedings under the Bengal Tenancy Act, and also during the same year 0·03 of a square mile of city area had been surveyed on the 64″ scale, but not *khanapuried*. There thus remained for the year under report, to complete the survey of the Municipality, only 0·04 of a square mile of *raiyati* lands, and 0·29 of a square mile of actual town area; also in order to complete the map, it was decided to survey the railway lands in their proper position on the plans. The following table shows the outturn accomplished during the year under report:—

Scale of survey.	Nature of Lands.		Number of plots.	Area in square miles.
1	2		3	4
64″ = 1 mile ...	Municipal ...	Town ...	1,494	0·29
16″ = 1 mile ...		Raiyati lands ...	149	0·04
64″ = 1 mile ...	Railway lands ...	... ...	92	0·16
		Total ...	1,735	0·49

Even if we could have obtained the plans of the railway lands belonging to the Railway Company, it would have been very inconvenient to use them, as the scale did not coincide with ours. Accordingly the Agent of the Bengal and North-Western Railway was asked to permit a new survey, and after some little delay sanction was accorded.

The traversing commenced on the 25th January. There are 154 stations and 9·81 linear miles of traversing. The exterior circuit followed the limits of the survey already accomplished during the previous season, and the area within this circuit was cut up into blocks by means of 42 sub-traverses running along the main streets and alleys. On *pucka* roads strong iron pegs, 9 inches

in length, were driven in, flush with the ground level, to mark traverse stations, and at all other stations wooden pegs were used. Marks in the form of a "broad arrow" were made on houses and trees adjacent to the traverse stations in order to guide the detail surveyors.

As soon as the demarcation of the municipal boundary had been completed by the Municipal surveyor, the boundary lines were accurately marked on the 16″ sheets of our previous season's work. The limits of the existing 16″ survey were then marked, by means of enlargement, on the new 64″ plots, in order to show the detail surveyors what portion remained for completion.

Four detail surveyors were employed and completed the survey during May, but the record of occupancy was not completed until June 1898. In addition to the amount of work shown in the foregoing tabular statement, the record of occupancy for 214 plots, contained in the town area previously surveyed, was written up during the year under report. The field sheets were only drawn in pencil in the field and inked up by trained draftsmen in office. This departure from the usual Bengal survey procedure was necessary, as very finished draftsmanship is essential in intricate town surveys.

In addition to frequent inspections by Mr. Kraal, one of his assistants, and by myself, the accuracy of the field sheets was tested by the independent resurvey of 15 blocks.

In the record of occupancy the entries against 375 plots were checked on the ground, which gives a percentage of 21 on the whole number of entries. The average size of the plot in the city area is only 0·17 of an acre, and in the *raiyati* area 0·25 of an acre. The 64″ survey is comprised in nine sheets.

At the request of the Agent of the Bengal and North-Western Railway Company, traces of the railway plans were made by one of our draftsmen and reduced to our scale for comparison of the boundaries as surveyed by us.

The Chairman of the Municipal Board has at my instigation erected seven large *pucka* pillars at points on the municipal boundary, where, owing to the absence of any clearly marked natural features, such as culverts over water-courses, there might have been future difficulty in locating the boundaries.

The estimate submitted to the Chairman was for Rs. 570. This provides for the following items:— (*a*) Large scale maps (64″ scale) of the intricate city area, (*b*) wall map on 16″ scale of the entire municipality, (*c*) record of occupancy comprising each plot within municipal limits.

The record of occupancy, which is written up on manuscript forms, in accordance with specimens drawn up by the Chairman in consultation with myself, includes the following items of information :—

Column 1.—Serial number of plot.
„ *2.*—Name of occupant, father's name, and caste.
„ *3.*—Name of landlord, also of ground landlord, if separate.
„ *4.*—Area of plot in acres and decimals.
„ *5.*—Area of plot in *bighas*, *kattas*, and *dhurs*.
„ *6.*—Description of plot, *i.e.*, whether *pucka* or *kutcha* house, road, tank, garden, etc.

In addition, space has been allowed for the subsequent entry of rent, taxes, etc., as may be found requisite by the municipal authorities. The wall map on 16″ scale covers an area of 1·75 square miles, inclusive of portions surveyed last year, and the record of occupancy comprises 5,074 plots, inclusive of extracts from the *khasras* of the portions *khanapuried* during the previous season. There was some discussion as to what plots should be included in the record of occupancy in cases where the boundary is merely an imaginary line cutting through fields. This discussion was due to the fact that in municipal taxation land is not assessed, but personal tax is levied, whereas, under the road cess, land is taxed; hence if lands exterior to the municipal boundary were included in the municipality, Government would be a loser. It was eventually decided to include plots cut through by the imaginary municipal boundary in the record of occupancy, but to note in the column of remarks the area of the portions of such plots lying outside the boundary.

The expenditure, inclusive of cost of control and instrumental charges, has been Rs. 684.

DISTRICT MUZAFFARPUR.

63. In the Annual Report of 1895-96 (page 48) mention is made of a survey of a boundary dispute between *mauzas* Sadipur and Manikpur, which was undertaken at the request of the Appellate Court and the cost met by the disputants.

During the year under report, Rs. 20 has been expended on the completion and final examination of the traverse records, and I am addressing the Court with a view to recovery of this small further expenditure.

Survey of Mauza Gobindpur Tera Rasia.

64. At the request of the Settlement Officer of North Bihar a topographical survey on the 16″ scale of mauza Gobindpur Tera Rasia in the Hajipur *diara* tracts was undertaken under Mr. Kraal's orders. This village had been originally surveyed cadastrally in 1893-94, and in 1895-96 the survey of Sabalpur necessitated a revision of the records of Tera Rasia (*vide* page 30 of Annual Report of 1895-96).

The area now topographically surveyed is 2,131·38 acres, or 3·33 square miles.

The survey has been tested by 3·85 linear miles of *partal* by the Inspector.

The cost, which will be met by the Settlement Department, amounts to Rs. 95.

PATNA DISTRICT.

RAILWAY GHAT SURVEY.

Survey of Pir Domaria and Patna Ghat.

65. The East Indian Railway Company claimed that the lands adjoining the foreshore of the Ganges river at the Patna *ghat* were acquired by them in 1852, prior to the acquisition of the main line lands, for the purpose of landing materials, etc., brought up by river from Calcutta.

Since then accretions were said to have formed which the Railway Company claimed, under certain rulings, as custodians of Government. In 1887 a claim was put forward for the foreshore, and the Railway Company have been paying, under protest, Rs. 500 a year as rent.

During the recess season the Board of Revenue, in their letter No. 356A, dated 13th May 1898, requested me to arrange for an accurate theodolite survey of the disputed lands.

The traversing was started by a native surveyor on the 16th August under the direct instructions of Mr. A. W. Smart.

The entire area traversed covers 230 acres, and includes Pir Domaria (area 25 acres). In order to connect the work with the existing railway lines, sub-traverses were taken along both the main and branch lines.

The theodolite was set up 94 times, or, excluding starting and closing angles, at 90 new stations. The linear miles of new chaining amount to 3·96. The traverse work was plotted on the 16″ scale, and the detail survey undertaken by a trustworthy native surveyor, who completed the survey by 27th September 1898. The survey was checked by a European Survey Officer, and found to be accurate.

For purposes of comparison with the old revenue survey of 1842 and the *diara* survey of 1864-65, the present survey was reduced in office to the 4″= 1 mile scale. The revenue survey boundaries and the *diara* survey boundaries were then transferred to the present map by means of the proportional compasses.

The results of these comparisons show as follows:—

(*a*) That no such village as Pir Domaria existed at the times of the revenue survey and of the *diara* survey;

(*b*) That the present village of Pir Domaria lies partly in *mauza* No. 122 Nagla and partly in No. 202 *mahal* Kiledari;

(*c*) That there has been no accretion since the surveys of 1842 and 1864-65; on the contrary the Ganges has encroached, and is now running alongside the masonry boundary wall of the railway company;

(*d*) That the jetty stands on the edge of the foreshore, as it existed in 1842 and in 1864-65, and that the river has encroached to both east and west of the jetty, cutting away the southern bank of the Ganges.

The Railway Company submitted a plan on the scale of 1″=150 feet, which is said to have been prepared by a *kanungo* in August or September 1897; but as this survey was not based on theodolite traverses, nor was it connected with any previous surveys, it was judged to be unreliable, and no notice has been taken of it.

The cost of this survey, which amounts to Rs. 152, will be paid by the Railway Company.

Shahabad District.

The Kachnar Mahal.

66. The Kachnar *mahal*, which is a private estate, lying within the Government estate of Banskati, in *pargana* Rhotas of the Sasaram subdivision of the Shahabad district, was demarcated and surveyed by Sub-Surveyor Irfan Ali, under the orders of Major (then Captain) G. B. Hodgson in 1893-94; (see page 57 of the Annual Report of that year). On the 29th March 1897 the Collector of Shahabad wrote, that he was unable to trace any of the marks put down by the Surveyor, although, according to Major Hodgson's report, "rough oblong stones 3 to 4 feet in length" were embedded at every bend of the boundary.

I was unable, during the season under report, to spare the services of a European Survey Officer to find these marks by means of the original map and *data* of the previous survey, but, as the work to be done was by no means intricate, I obtained the sanction of the Board (Board's letter No. 93A, dated 1st November 1897) to the deputation of a native Surveyor for this work.

On the 2nd December 1897 Sub-Surveyor Sarju Pershad (the services of Surveyor Irfan Ali who did the original survey in 1893-94 not being available, as he had left the Bengal Surveys) was despatched, with a professional chainman and the necessary instruments, to report himself to the Subdivisional Officer of Sasaram. On the 22nd December the original maps, which had to be procured from the Calcutta office, were forwarded to the Surveyor, who in the meantime had been employed on line-clearing, to commence the relaying of the marks.

The Collector had reported previously that 60 large stone pillars were ready, and that orders for a further supply had been issued.

The work dragged along very slowly (owing, according to the reports of the Surveyor, to heavy line-clearing being necessary and to great difficulties in obtaining assistance locally) until the 1st April 1897, when I sent an experienced Surveyor, by name Kundan Lal, to inspect the work done, and to report result to me personally. According to the report received on 12th April, there was only work for about 10 days left, and the Subdivisional Officer of Sasaram was written to to depute a responsible official to attend on the Surveyor, who would point out all the marks embedded by him; but as up to the 18th May 1898, nobody attended on the Surveyor to take over the marks, I withdrew the Surveyor and reported the matter to the Collector.

I have since ascertained, after the return of the Surveyor, that he has misunderstood his instructions, and I have not the slightest doubt that many of the marks put down are not in their proper positions. I have reported the matter to the Collector, and intend sending a European Survey Officer during November next to test the work done, and to rectify it where necessary.

The Collector, in the course of correspondence, suggested that the Surveyor was in collusion with the native *zamindars*, but I have as yet no proof of this, although it is quite probable that the Surveyor has put forward the plea of

stupidity in the hope of escaping the more serious charge of rascality; however, the facts will be patent as soon as the European officer has inspected the work, and in the meantime I have directed that the Surveyor's pay be kept in hand. Personally, I hardly think the Surveyor has been in collusion with the local *zamindars*, as he must have known that his work would be carefully tested, but it is somewhat difficult to understand his having made mistakes in such a simple matter as the finding of marks by the aid of an accurate map.

The expenditure has been Rs. 446, which, in accordance with the orders of the Board, has been debited to the general grant for Bihar traverse. The probable expenditure during the coming season will be another Rs. 100, which will be met from the same source.

REPORT ON RELAYING OF MARKS, &c., ON THE NEPAL FRONTIER TOUCHING ON DISTRICTS BHAGALPUR AND PURNEA.

Preliminary arrangements.

67. Received on 24th March 1897 copy of Government of Bengal letter (Political) No. 721P., dated 4th March 1897, with enclosures, under cover of the Deputy Surveyor-General in charge, Revenue Branch, No. $\frac{52}{R.-24-7-1}$, dated 23rd March 1897.

On 26th March replied to the Deputy Surveyor-General (*a*) and wrote to Board (*b*), forwarding an estimate for the work; also on 27th March to Survey Office at Dehra Dun (*c*) for the traverse data required.

(*a*) No. $\frac{743}{R.B.III-11}$, dated 26th March 1897.

(*b*) No. $\frac{744}{R.B.III-11}$, dated 26th March 1897.

(*c*) No. $\frac{747}{R.B.III-11}$, dated 27th March 1897.

On 30th March received copies of Government of Bengal endorsement No. 997P., dated 24th March, under cover of the Deputy Surveyor-General's No. $\frac{61}{R.-24-7-7}$, dated 29th March 1897.

On 17th April wired to Board for a reply to my No. $\frac{744}{R.B.III-11}$, to which Board replied on 19th that a reference had been made to Government.

On 10th May, not having received definite orders, wired to Board suggesting postponement of the work, as the season was too far advanced.

On 1st June received copy of Bengal Government letter No. 1459P., dated 11th May, under cover of Board's endorsement No. 60A, dated 22nd May, stating that cost should be debited to Miscellaneous in Political Budget, Provincial, and that I should correspond with Commissioner of Bhagalpur as to details of the work.

On 5th June received Bengal Government letter No. 98P.D., dated 24th May, under cover of Board's endorsement No. 62A, dated 31st May, sanctioning proposal to postpone work.

On 11th August 1897 addressed Commissioner of Bhagalpur* regarding detailed proposals for relaying of marks during the coming cold weather, and asking that arrangements be made for attendance of the Nepalese officials.

* No. $\frac{2001}{R.B.III-11}$.

On 2nd October received reply from Commissioner,† stating that arrangements had been made for attendance of a Nepalese officer at the trijunction of Bhagalpur, Darbhanga, and Nepal on 7th November 1897.

† No. 1337J., dated 29th September 1897.

On 24th October saw Mr. E. F. Berkeley, Sub-Assistant Superintendent (whom I had deputed for this work), at Dinapore, and gave him detailed instructions.

Work on Kosi River, subdivisions Supaul of Bhagulpur and Araria of Purnea.

68. It appeared from the printed correspondence received from Government and from the Deputy Surveyor-General's letter No. $\frac{52}{R.-24-7-1}$, dated 23rd

March 1897, that in the Supaul subdivision of district Bhagalpur, the following amount of work was to be done:—

(*a*) Refixing of position of stone prism No. 17.
(*b*) Nailing tin tickets with numbers on to wooden posts Nos. 84 to 125.
(*c*) Settlement of a boundary dispute on the Tiljuga river.
(*d*) Demarcating boundary on Kosi river, which was relaid by Mr. O'Sullivan in 1882-83.

On Mr. Berkeley's arrival in the subdivision he ascertained that, of the above items, the first three had been carried out by the Subdivisional Officer—*vide* his No. 334S., dated 28th May 1896 (of which I had received no copy).

Mr. Berkeley, however, while awaiting information as to whether the Kosi river was low enough to allow of work being commenced, tested the position of stone prism No. 17, relaid by Subdivisional Officer, and of wooden post No. 123, both of which were found to be correct, but the wooden post was without a tin number ticket which he affixed.

In the course of his measurements Mr. Berkeley found that wooden post No. 121 had been moved to a point 1·12 chains east of stone prism No. 17 and 1 chain west of a branch of the Tiljuga river. Mr. Berkeley gives the measurements of the present position of wooden post No. 121 as 27·54 chains from wooden post No. 122 and 39·69 chains from wooden post No. 123 (*vide* Sheet No. 16, Nepal Boundary Survey).

On 14th November Mr. Berkeley moved to Birpur to inspect the Kosi himself and found work practicable, and wrote to Subdivisional Officers, Supaul and Araria, to be present with Nepalese officers on 25th November. In the meantime he proceeded with some line-clearing and theodolite traversing which were necessary in connection with this work.

Mr. Berkeley reports that stone prism No. 1 is out of position; it is not actually on the boundary, but lies in the neutral zone. Mr. Berkeley was informed that the stone prism in question was embedded in connection with the Srinagar-Baneli Survey of 1887-88.

The work on the Kosi river was to relay wooden posts Nos. 72 to 83 inclusive, as all these had been washed away, and to test the present positions of wooden posts Nos. 65 to 71, as these had been called in question; also to re-erect pucka pillars Nos. 13 and 14, washed away.

After Mr. Berkeley had completed his traverse polygon and plotted all existing pillars and posts thereon, a comparison was made with Captain Samuell's map of 1874-75. The result was to prove that wooden posts Nos. 67 to 71 were out of position.

Mr. Berkeley then, accompanied by the Deputy Magistrate of Araria, marked (with especially prepared wooden pegs) on the ground the proper position of wooden posts Nos. 66 to 83 and the two pucka pillars Nos. 13 and 14.

On the 3rd December a Nepalese official, the Lieutenant of Rangli, attended and accompanied the Survey Officer and Deputy Magistrate.

New wooden posts were erected on the sides of old wooden posts Nos. 14, 17, 18, 31, 32, 39, 51, 57, and 58.

In addition to the above amount of work, a new wooden post, No. 41, was erected 50 links to the south of its old position, on the line to wooden post No. 40, instead of the old post partially burnt and standing right on the edge of a stream.

A new wooden post, No. 30, was erected (instead of the old post washed away) on the line between wooden posts Nos. 29 and 31, at a distance of 17 chains from the former. The wooden posts Nos. 25 and 26 had been washed away by the Kosi river, the main stream of which now covers their sites: therefore new wooden posts Nos. 25 and 26 have been erected on the line between Nos. 24 and 27, No. 25 now being 12·42 chains to north of No. 24, and No. 26 being 15 chains to south of No. 27.

A new wooden post, No. 16, was also erected, as the old one had been washed away. The new post is on south bank of the Sursardhar river, 16 chains distant from wooden post No. 15, on the alignment of wooden posts Nos. 15 and 17.

Mr. Berkeley then continued his march, accompanied by the Deputy agistrate and the Nepalese officer eastward, along the boundary of the Araria

subdivision, and re-erected new posts in the old sites of wooden posts Nos. 49, 50, 66, 80, and 81.

The pucka pillar No. 57, on the Telania river, was found to be very much out of repairs, and should be entirely rebuilt.

He also had new tin tickets with numbers thereon nailed on to all posts requiring them.

Mr. Berkeley reported that he found two wooden posts without numbers and not shown on the map, between wooden posts Nos. 43 and 44, and I informed the Commissioner of this, and suggested that as they had nothing to do with the boundary, they should be removed. To this the Commissioner and Magistrate of Purnea agreed, and it was at first reported that these pillars had been erected by the villagers at time of settlement of a dispute among themselves, but later on* it was ascertained that these two posts were erected during 1886-87, in the presence of a Nepalese official to demarcate the original position of the Nunar river, which here forms the boundary.

* Letter No. 126J., dated 5th April 1898, from Subdivisional Officer, Araria.

It was also reported that the ditch which had been originally excavated along the boundary was greatly out of repair—in fact, in parts not traceable. After some correspondence between the Commissioner and the Magistrates of Bhagalpur and Purnea and self, and after I had obtained copies of the old reports on the Nepal frontier survey, I reported to the Commissioner† that as the boundary is clearly a pillar-to-pillar one, except where it follows a natural feature, such as a stream, and that on the frontier survey maps of the Purnea district not only is the ditch not indicated, but no reference is made thereto, it is clear that the ditch does not form an integral part of the boundary line, and may be treated as merely an extra demarcation mark, and I therefore suggested that, as the expense of re-excavating the ditch and its upkeep thereafter would be very considerable, no notice whatever should be taken of the ditch. To this the Commissioner agreed.‡

† My No. $\frac{12}{\text{R. B. III-11}}$, dated 3rd January 1898.

‡ Commissioner's No. $\frac{\text{J.}}{\text{96Ct.}}$, dated 20th January 1898.

On the 14th December the work in the Araria subdivision was completed, and the Deputy Magistrate of Araria and the Lieutenant of Rangli departed.

District Purnea, subdivision Kishanganj.

69. On the 15th December Mr. Berkeley was met by the Subdivisional Officer of Kishanganj, but the Nepalese official of Jhapa had not arrived. As Mr. Berkeley was urgently required for his ordinary duties in the Bihar survey, and I could not afford to keep him waiting indefinitely on the Nepal frontier, I re-called him with orders to hand over to Mr. C. S. Gasper, Sub-Assistant Superintendent, and I wrote to the Commissioner, asking for arrangements to be made for attendance of the Suba of Hanumannagar on the 25th January 1898 for the final fixing of the pillars and posts on the Kosi river, the positions of which had been temporarily marked by Mr. Berkeley. I ordered Mr. Gasper to be at Birpur for the Kosi work on the 25th, but on Mr. Gasper's arrival at Partabganj (on the way to Birpur) on the 24th he was met by the Subdivisional Officer, Supaul, who informed him that the Suba of Hanumannagar was not present, as he had been transferred, and no successor had as yet been appointed. I then wired to the Commissioner to ask him to arrange for immediate attendance of the Suba, and directed Mr. Gasper to await further instructions. The Commissioner wired reply to me on 1st February, to the effect that the Resident had replied that he could not give a definite date for attendance of the Nepalese official, but had referred to the Darbar. I then wired to Mr. Gasper to take up the Kishanganj work first, and to return on completion thereof for the Kosi work, as by that time I hoped definite arrangements would be made for the attendance of the Suba of Hanumannagar. I also wrote to the Commissioner,* informing him of the orders I had wired, and asking him to arrange for the presence of the Suba of Hanumannagar at Birpur on or about 1st March.

* No. $\frac{273}{\text{R. B. T.}}$, dated 3rd February 1898.

Mr. Gasper arrived at the triple junction of Kishanganj, Araria, and Nepal on the 13th February, and was met there by the Subdivisional Officer of Kishanganj and by the Subadar of Jhapa.

As there are no wooden posts between pucka pillar No. 39 (the trijunction) and pucka pillar No. 28, and the Subdivisional Officer had himself inspected the pillars between these two points only two months previously, it was decided not to waste time going over this portion again, but to commence work from pucka pillar 28 and to march along the boundary from there up to the Darjeeling trijunction, which was reached on the 20th February.

During the march along the boundary, the following amount of work was accomplished:—

(*a*) Pucka pillars Nos. 20 to 1 inclusive were numbered with tin tickets.

(*b*) Wooden posts Nos. 25 to 18 inclusive, and wooden posts Nos. 16, 14, 12, 11, 8, 9 to 3 inclusive, and also the wooden post at Darjeeling trijunction, had tin tickets with numbers affixed thereto.

(*c*) The following new wooden posts were erected at original sites:— Nos. 41, 36, 33, 32, 30, 28, 17, 15, 13, 10, and 2.

(*d*) Pucka pillar No. 24 which had been rebuilt was found not to be on site of the old pucka pillar No. 24, nor had it been marked on the map. Its present position has been found by measurement as follows:—

From wooden post No. 27	...	= 26·00 chains.
From pucka pillar No. 23	...	= 63·78 „
From wooden post No. 25	...	= 19·73 „

(*e*) A temporary wooden post has been erected on the original site of pucka pillar No. 24, but as this falls into the bed of the Kanhai river, it will, without doubt, be washed away.

(*f*) A wooden post had been erected on the old site of pucka pillar No. 22, and was found to be out of position, and has been moved to its proper place, *i.e.*, original site of pucka pillar No. 22.

(*g*) The site of pucka pillar No. 5 (which had been washed away) was found to be marked by a wooden post which was numbered 5P.

On the 21st Mr. Gasper signed *rubkares* prepared by the Nepalese official and Subdivisional Officer, and returned to Partabganj for the Kosi work on 23rd February.

Kosi river, subdivisions Supaul and Araria.

70. On the 2nd March Mr. Gasper met the Subdivisional Officer, Supaul, and the Nepalese Suba at Birpur, and commenced work with reference to the relaying of the marks on the Kosi river.

New pucka pillar No. 13 was rebuilt on its old site.

Pucka pillar No. 14 was found to have been washed away, and as its site is in the river bed, it was useless to replace it.

The following five new wooden posts, Nos. 80 to 76 inclusive, were erected, none on their original sites, as it was thought advisable to distribute these five posts between two points (on the original boundary), where a new *char* had formed. New wooden post No. 80 has, however, been erected on the old site of wooden post No. 79, and new wooden post No. 79 on the old site of wooden post No. 77.

The sites of old wooden posts Nos. 80, 78, and 76 have not been marked. (For the present position of these posts, see corrected sheet No. 13 of Nepal Boundary Survey.) All this has been done with the agreement of the Subdivisional Officer and of the Nepalese representative.

New wooden posts Nos. 74, 73, and 72 erected on old sites.

Site of wooden post No. 75 falls into river, and could not be marked by a post.

Sites of wooden posts Nos. 65 and 66 also in river, and would be washed away.

Although wooden posts Nos. 71 to 67 inclusive were found by Messrs. Berkeley and Gasper to be out of position, the Nepalese representative would not allow them to be moved to their proper positions without a special reference to the Nepal Darbar.

Wooden posts Nos. 81, 82, 83, erected on previous sites, as marked by Mr. Berkeley.

Wooden posts Nos. 112 and 117 were erected on old sites.

As the reply from the Darbar regarding removal of wooden posts Nos. 67 to 71 to their proper position could not be expected for about a month, I directed Mr. Gasper to return to his ordinary duties, which he did on 12th March.

It was not until the 23rd May that I received information that the Darbar agreed to the moving of wooden posts Nos. 71 to 67 to their proper sites, and as all the survey parties had by that time moved into their recess quarters, and all the officers were otherwise fully occupied, I was unable to depute any officer to attend to the work before the rains.

71. The following statement shows the work accomplished in each subdivision:—

Tabular statement of work done during 1897-98 on the Nepal Frontier.

District and Subdivision.	Pillars erected—		Wooden posts erected—		Pillars on which tin tickets with numbers have been affixed.	Wooden posts on which tin tickets with numbers have been affixed.	Remarks.
	On old sites.	On new sites.	On old sites.	On new sites.			
1	2	3	4	5	6	7	8
	No.	No.	No.	No.	No.	No.	
Supaul subdivision, district Bhagalpur ...	13	...	72 73 74 81 82 83 112 117	76 77 78 79 80	...	123	Tested position of stone prism No. 17 and of wooden post No. 123; found correct. Tested position of wooden post 121 (not on old site); fixed present position by measurements.
Total ...	1	...	8	5	...	1	
Araria subdivision, district Purnea ...	...	...	14* 17* 18* 31* 32* 39* 51* 57* 58* 49† 50† 66† 80† 81†	16* 25* 26* 30* 41*			* Sheets Nos. 12, 13, and 13A. † There are two serial numberings of pillars and posts in the Araria subdivision. These posts belong to the serial to the east of the *old* trijunction between Purnea and Bhagalpur, and are found in sheets Nos. 8, 10, and 11 of Nepal Boundary Survey. Two wooden posts without numbers and not shown on original map found between pucka pillars Nos. 43 and 44 on the Nuna river.
Total ...	...	...	14	5	...	...	

District and Subdivision.	Pillars erected—		Wooden posts erected—		Pillars on which tin tickets with numbers have been affixed.	Wooden posts on which tin tickets with numbers have been affixed.	Remarks.
	On old sites.	On new sites.	On old sites.	On new sites.			
1	2	3	4	5	6	7	8
	No.	No.	No.	No.	No.	No.	
Kishanganj subdivision, district Purnea ...	5(*a*)	...	2	...	1	1 put at Darjeeling trijunction.	
	24(*b*)	...	10		2	3	(*a*) Wooden post erected here and marked 5P.
			13		3	4	
			15		4	5	
			17		6	6	(*b*) Wooden post erected on original site of old pucka pillar No 24.
			28		7	7	
			30		8	8	Pucka pillar was found to have been put up away from its old site (temporarily marked by a wooden post, see note (*b*) above), and its present position fixed by measurements.
			32		9	9	
			33		10	11	
			36		11	12	
			41		12	14	
					13	16	
					14	18	
					15	19	
					16	20	
					17	21	
					18	22	
					19	23	
					20	24	
						25	
Total ...	2	...	11	...	19	20	
Grand Total ...	3	Nil.	33	10	19	21	

72. The following is the amount of work remaining for next season.

Subdivisions Araria and Purnea.

Removal of wooden posts Nos. 67 to 71 inclusive and replacement thereof on their proper sites.

Test position of two extra wooden posts between pucka pillars Nos. 43 and 44—*vide* paragraph 68 of this report.

Subdivisions Supaul, Bhagalpur.

As the Kosi river shifts every season, I think it most probable that pucka pillar No. 13, as well as all the wooden posts lately put up from Nos. 71 to 83 inclusive, will be washed away.

It would be a very expensive procedure to send a Survey Officer every year to relay all these points, and an inspection of the map of this part of the boundary (sheet No. 13, Nepal Boundary Survey) shows that the only bends in the boundary are at the following points:—

(*a*) Pucka pillar No. 13.
(*b*) Wooden post No. 76.
(*c*) A point 27·10 chains to south of new wooden post No. 74, and about 7·50 chains to south of site of old wooden post No. 75.

I would suggest that the positions of these three points be permanently fixed by erecting reference pillars on the nearest points on the high banks on each side, so that the intersection of the lines drawn between these reference pillars would indicate the sites of the three points above.

I had already suggested this to the Commissioner,* who notified his approval thereto, and I had instructed Mr. Gasper to proceed accordingly, but the Nepalese "Suba" objected to any pillar (reference or otherwise) being erected on Nepalese territory without a reference to the Darbar, and as Mr. Gasper could not wait for a reply to the reference, the plan had to be abandoned, but I would strongly recommend its being adopted next season. Wooden posts can be erected temporarily on the old sites of the points (*a*), (*b*), and (*c*) next year by the Survey Officer as well as the reference pillars, by whose aid these temporary posts can be replaced each year by the District Officer, and any number of supplementary posts can be erected each year as may be found necessary.

* No. $\frac{125}{\text{R. B. T.}}$, dated 18th January 1898.

Expenditure incurred.

73. The expenditure on this work during the year under report has been Rs. 1,826 inclusive of shares of controlling office and instrumental charges.

ORISSA DIVISION.

Revision Survey.

74. Under the orders of the Deputy Surveyor-General the sum of Rs. 22 is debitable to Orissa, on account of the departmental leave pay of two *tindals* who were employed on some revision work under the orders of the Deputy Surveyor-General.

CHAPTER III.

PART I.—PROGRAMME OF SEASON 1898-99.

75. On the 1st October 1898 (commencement of survey year 1898-99), the areas remaining to complete the survey of North Bihar were as follows:—

District.	Traverse survey.	Cadastral survey and records.	*Diara* Topographical survey.
1	2	3	4
	Sq. m.	Sq. m.	Sq. m.
Saran ...	143	535	87
Darbhanga ...	521	1,900	...
Total ...	664	2,435	87

76. The existing orders of the Government of India (letter No. $\frac{1368}{40-6}$, dated 3rd June 1896) are that this amount of work is to be completed by one traverse section and two cadastral sections working up to the 30th September 1900, and the following table shows the area to be undertaken during the coming survey year 1898-99:—

District.	Traverse survey.	Cadastral survey and records.	*Diara* Topographical survey.
1	2	3	4
	Sq. m.	Sq. m.	Sq. m.
Saran ...	143	535	87*
Darbhanga ...	521	680	...
Total ...	664	1,215	87*

* Note.—This 87 square miles is merely approximate, and the actual area depends on the position of the Ganges river. Moreover, it is impossible to say beforehand how much of the area which is decided to be *diara* lands will be cadastrally surveyed and how much topographically.

Thus the survey of the Saran district will be completed by 30th September 1899, and the cadastral section be available for transfer to Darbhanga, to aid the other section, already in Darbhanga, in completing the large programme of 1,220 square miles during 1899-1900. The traverse section, on completion of

the traversing of the North Bihar districts by 30th September 1899, will be available for transfer to the Sonthal Parganas, where, under existing arrangements (letter No 766—T.R., dated 15th September 1896, from the Secretary to the Government of Bengal, to the Secretary to the Government of India), it will have to take up the traverse survey of an area of 1,420 square miles of the Damin-i-Koh in the Sonthal Parganas.

The small area, approximately 60 square miles, in Noakhali, comprising *chars* King, Mir Mahomed Ali, and some other scattered islands, which remains for topographical survey, is not, under the latest instructions to hand (Board's letter No. 51A., dated 2nd September 1898), to be taken up until October 1899. I have no orders for the survey, during the coming season, of the Majnamutha, Jalamutha, and Balarampur estates in the Midnapore district, and therefore have not included them in my programme.

An application has been filed by Raja Sir Saurendra Mohan Tagore, K.C.I.E., for a cadastral survey with records of estates Nos. 1721-1722, total approximate area 256 square miles, of *pargana* Chandradip in the Backergunge district, but I understand that only some traversing is likely to be required during the coming season, and that not until February or March 1899.

There is an area of 90 square miles in the north of the Champaran district, which forms a gap between the cadastral survey completed in 1895-96 and the topographical survey of 1883-84-85, which was undertaken in connection with the survey of the Nepal frontier, and which has now to be topographically surveyed on the 2″ scale, in order to complete the standard mapping. In the Annual Report of 1895-96, paragraph 69, mention is made of a tract of 290 square miles left unsurveyed in the north of the Champaran district. Of this 290 square miles, 200 are comprised in the topographical survey of 1883-84-85, and the sanction of the Government of India has just been obtained to the traverse and topographical survey of the remaining 90 square miles, which will be undertaken by a small detachment from No. 4 Party (Bihar).

The Deputy Commissioner of Manbhum has just applied for a traverse and topographical survey of 171 villages, covering an area of 87·5 square miles, belonging to the Panchet encumbered estate in *pargana* Shergarh of the Burdwan district. This survey will probably be on the 4″=1 mile scale, and, besides showing village boundaries and the ordinary topographical items, will pay special attention to all collieries, whether working or abandoned.

The Collector of Darbhanga has applied for the survey and settlement of Circles I and II of the Paighambarpur estate, comprising 34 villages and covering an area of 33 square miles in district Bhagalpur, which, I understand, is to be undertaken during the coming season.

The Chairman of the Darbhanga Municipality has applied for a survey of the city on the 64″=1 mile scale, together with a record of occupancy. The total area of the Municipality is estimated to be 7 square miles, and to contain about 15,000 holdings. In addition to the 64″ survey, the Municipality will be provided with a wall map on the 16″=1 mile scale, which will also serve as an index to the numerous 64″ sheets.

The existing map of the Roserah Municipality, which was prepared by the Municipal Surveyor, is to be tested by us next year. The Roserah Municipality was omitted from our operations during the past season, and the coming test survey will show whether or not the existing map will suffice for the purposes of the standard mapping; and also I shall be able to advise the Municipal Commissioners as to the necessity of a fresh survey.

The Magistrate of Saran has just notified that a large scale survey of the Chapra Municipality is desirable; but as there appears to be some difficulty about the provision of the necessary funds, the matter has been referred to the Board for orders.

The Board has just asked for an estimate for the survey of a *diara* estate now in Shahabad, but lately belonging to Ballia. The estimate has been submitted, and the orders of the Board are awaited.

During the coming season an officer will be deputed for the relaying of marks on the Nepal frontier within the limits of the Kosi river.

An officer will also be deputed to test the relaying of marks on the Kachnar Mahal boundary in district Shahabad. This officer will also correct on the ground any faulty work he may find.

77. The following statement exhibits in a tabular form the whole programme of the Bengal surveys for 1898-99 as far as I am at present informed :—

District.	Traverse survey.	Cadastral survey and records.	Topographical surveys.		
			16″ scale.	4″ scale.	2″ scale.
1	2	3	4	5	6
	Sq. miles.	Sq. miles.	Sq. miles.	Sq. miles.	Sq. miles.
Saran	143	535	87	...	...
Darbhanga	521	680	...	...	...
Backergunge	150(*a*)	...	...	...	...
Champaran	90(*b*)	...	...	...	90(*b*)
Burdwan	88(*c*)	...	...	88(*c*)	...
Bhagalpur	33(*d*)	33(*d*)	...	...	...
Darbhanga City	7(*e*)	7(*e*)	...	...	...
Rosera „	2(*f*)	2(*f*)	...	...	...
Nepal Boundary	... (*g*)	... (*g*)	...	...	...
Shahabad (Kachnar Mahal) ...	... (*h*)	... (*h*)	...	...	...
Total ...	1,034	1,357	87	88	90

(*a*) The cost of this work to be provided by the local authorities.
(*b*) Cost provided by Government of India.
(*c*) Cost to be provided by Deputy Commissioner, Manbhum.
(*d*) Ditto ditto by Collector, Darbhanga.
(*e*) This is a 64″ detail survey. Cost to be provided by the Municipality.
(*f*) Test survey only. Cost to be provided by Municipality.
(*g*) Relaying of boundary marks. Cost met by Political Department.
(*h*) Ditto ditto. Cost will be met from Bihar grant.

PART II.—TOURS OF THE SUPERINTENDENT, SETTLEMENT-SURVEYS.

1897.

78. *21st October.*—Left Mussoorie for Dinapore.

23rd October.—Arrived Dinapore—Interviewed officers in charge of sections and gave final orders for taking the field. Instructed Mr. E. F. Berkeley regarding Nepal frontier work.

28th October.—To Muzaffarpur to see Settlement Officer, North Bihar, and thence into Darbhanga district. Was inspecting in field until 12th December 1897.

12th December.—To Calcutta to consult with the Surveyor-General and Board regarding the *badar* office.

17th December.—Returned to Bihar and inspected work of surveyor-munsarims in Muzaffarpur. Remained inspecting work in Darbhanga and Saran until 20th April 1898. During January 1898 the Deputy Surveyor-General was in camp with me inspecting the Bihar surveys.

1898.

20th April.—Left for recess quarters at Mussoorie; arrived there on 23rd and opened my personal recess office.

1st August.—Left Mussoorie to inspect the cadastral section recessing at Digha; also interviewed Settlement Officer at Muzaffarpur and on to Calcutta.

11th August.—Returned to Mussoorie—Office work until 30th September 1898.

79. I was on tour during the following months:—

			Days.
October	1897	during	11
November	„	„	30
December	„	„	31
January	1898	„	31
February	„	„	28
March	„	„	31
April	„	„	19
August	„	„	11
		Total ...	192

PART III.—INSPECTION BY THE DEPUTY SURVEYOR-GENERAL.

80. During January 1898 the late Major-General R. G. Woodthorpe, C.B., R.E., Officiating Deputy Surveyor-General in charge of the Revenue Branch, Survey of India, was in camp with me for about three weeks inspecting the offices of the traverse and cadastral sections and the field work in progress. His report, dated 8th February 1898, is as follows:—"During my stay last month at Somastipur with Captain Crichton, ample opportunities were afforded me of seeing how the settlement-survey work is being carried on in all its branches, in the field as well as in office. I was very much pleased with all I saw. The survey is proceeding on a sound basis, and the careful supervision exercised by the Superintendent and his assistants secures the accuracy of the work throughout. I am glad to see that Captain Crichton's efforts to improve the draftsmanship of the *amins* is meeting with success, for I noticed that some of the sheets are exceedingly neatly drawn and inked-up."

During October 1897 Lieutenant-Colonel J. R. Hobday, R.S.C., who was at that time officiating as Deputy Surveyor-General, inspected the Mussoorie office and expressed himself as satisfied with all he saw.

PART IV.—SERVICES OF OFFICERS.

81. Mr. H. Dowman, Extra Assistant Superintendent, 1st grade, who joined the Bengal Surveys at the close of the preceding season, has been in charge of the Bihar Traverse Section during the entire year under report. He is an officer of long departmental experience, and well acquainted with every detail of traverse work. He has managed his section very well.

Mr. A. W. Smart, Extra Assistant Superintendent, 5th grade, has been in charge of the Saran Cadastral Section. Mr. Smart is quite one of the best Revenue Survey officers in the Department. During the season he has successfully completed the survey and record-writing (the latter extremely difficult) of a large area containing nearly 12 *lakhs* of fields. This speaks for itself, and is clear testimony to Mr. Smart's able management.

Mr. C. S. Kraal, Extra Assistant Superintendent, 6th grade, remained in charge of the Darbhanga Cadastral Section. He also completed a large area containing 11 *lakhs* of fields. Mr. Kraal is a painstaking officer who may be trusted to do his best. I am generally well satisfied with his work, but I consider that he has been handicapped by an indifferent office establishment, of which I am about to change the entire *personnel*.

Mr. E. F. Berkeley, Extra Assistant Superintendent, 6th grade, was employed during the early part of the season on the Nepal frontier work and afterwards with the Saran Cadastral Section. He is an able assistant, quite fit for a charge, and has given me complete satisfaction during the year under report.

Mr. T. W. Babonau (Junior), Sub-Assistant Superintendent, 1st grade, joined the Bengal Surveys on transfer from Burma on the 9th December 1897, and was attached to the Darbhanga Cadastral Section until the close of the field season, when he was transferred to the traverse section. Mr. Babonau is intelligent and hardworking, but unfortunately his health, which had broken down in Burma, is very indifferent.

Mr. C. G. Lee, Sub-Assistant Superintendent, 1st grade, rejoined the Bengal Surveys on the 20th October 1897 and was employed with the Darbhanga Cadastral Section throughout the field season, and until he was transferred, at the request of the Government of India, during July 1898 to the Siamese Government, Mr. Lee had been in the Bihar survey since the commencement of the work, and was a very valuable assistant.

Mr. C. S. Gasper, Sub-Assistant Superintendent, 1st grade, was attached to the traverse section throughout the year under report, but during January, February, and a portion of March he was employed on the Nepal frontier work. Mr. Gasper has now served under me for the past seven years in Orissa and Bihar, and I consider him a very promising officer, and well up in all details of cadastral survey with record-writing.

Babu Nilmoni Chatterji, Sub-Assistant Superintendent, 2nd grade, has been attached to the Darbhanga Cadastral Section throughout the year. He has as usual worked very well, and afforded valuable aid to the officer in charge of his section.

Mr. P. L. Causeley, Sub-Assistant Superintendent, 2nd grade, joined the Bengal Surveys on the 23rd November 1897, and has remained attached to the Saran Cadastral Section. As he had no previous experience in cadastral surveys, he was at first under practical training. He has now grasped the details, and will, with experience, become a valuable assistant.

Mr. H. T. Hanby, Extra Assistant Superintendent, 2nd grade, who, although borne on the strength of the North-West Provinces Surveys, was temporarily lent to Bengal by order of the Surveyor-General from the 1st May 1898 for the recess season, in order to complete some arrears of traversing taken over from the late Nos. 2 and 8 Parties, has worked with his usual zeal, and his services have been most valuable.

Mr. H. H. Taylor, Supervisor, on the temporary list, attached to the Saran Cadastral Section, has worked very well.

During the recess season two more Supervisors, viz., Messrs. A. E. LeFranc and W. Babonau, were temporarily engaged to aid in the very heavy recess work of the Darbhanga Cadastral Section, and to replace Mr. C. G. Lee, transferred to Siam. Both these officers have worked well, and during next season will be taught the details of the field work and utilized for supervision.

PART V.—CO-OPERATION OF LANDLORDS, &c.

82. Mr. E. Macnaghten, Secretary of the Indigo-Planters Association, has (as since the commencement of the Bihar survey) been ever ready to help us during the year under report. Many of our difficulties have been smoothed away by Mr. Macnaghten's influence and support.

All planters and managers of indigo concerns have almost invariably afforded every possible assistance to the survey officers.

Co-operation of Revenue Officers.

83. The Collectors of Saran and Darbhanga have helped us whenever called upon.

The Settlement Officer of Noakhali, Bhupendra Nath Gupta, has been of the very greatest assistance to me.

Mr. C. Stevenson-Moore, I.C.S., Settlement Officer of North Bihar, has co-operated with me most thoroughly in every respect, and it has been a pleasure to me to work with him. My relations with Mr. P. C. Lyon, I.C.S., Director of the Department of Land Records and Agriculture, have been most cordial.

I have the honour to be,

SIR,

Your most obedient servant,

R. CRICHTON, CAPTAIN, I.S.C.,

Superintendent of Settlement-Surveys in Bengal.

APPENDIX I.

Summary of the Outturn of work of the Survey Parties in Bengal for the year 1897-98.

Scale of Survey.	Locale of field operations.		Traversing.						Topographical Survey.		Cadastral Survey.						Record-writing.		
	Division.	District.	Number of villages.	Square miles of village survey.	Linear miles.	Number of stations at which the theodolite was set up.	Number of azimuths.	Number of great trigonometrical connections.	Number of villages.	Area in square miles.	Number of villages.	Area in square miles.	Number of fields.	Number of linear miles of test survey.	Average size of fields in acres.	Number of sheets.	Number of villages.	Number of fields.	Area in square miles.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		Temporarily-settled and Government estates.																	
16″ = 1 mile ...	Chittagong ...	Noakhali (Government estates).	...	...	...	...	...	...	...	...	(*a*)6	10	6,666	53	1·54	9	(*a*) 6	2,254	10
		Private estates.																	
16″ = 1 mile ...	Patna	Saran	(*b*)86	(*c*)51	295	1,613	13	...	(*d*)41	(*e*)27	(*f*)877	555	1,180,871	(*g*)3,123	0·39	(*h*)1,656	(*f*)877	1,180,871	555
		Darbhanga	911	598	2,617	18,755	127	4	...	...	965	733	1,100,808	(*i*)3,177	0·42	(*j*)1,938	965	1,100,808	733
		Muzaffarpur	(*k*)20	(*l*)10	(*m*)...	(*m*)...	(*m*)...	...	(*k*)10	4	(*k*)5	2	250	(*n*)29	3·72	(*o*)18	5	250	2
		Miscellaneous.																	
16″ = 1 mile ...	Patna ...	Muzaffarpur (Gobindpur Tera Rasia).	...	...	...	...	...	...	1	3	...	...	...	4	...	...	...	...	...
64″ = 1 mile and 16″ = 1 mile.		Darbhanga (Somastipur Municipality).	37	1	10	154	...	...	...	...	7	2	5,074	(*p*)...	0·20	(*q*)18	7	5,074	2
16″ = 1 mile ...		Shahabad (Kachnar Mahal) ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4″ = 1 mile ...		Bhagalpur and Purnea (Nipal Frontier).	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16″ = 1 mile ...		Patna (Railway Ghat survey).	3	1	4	94	...	...	3	1	...	...	...	...	...	1	...	...	...
		Total ...	1,027	661	2,926	20,616	140	4	55	35	1,860	1,302	2,293,669	6,386	...	3,640	1,860	2,291,257	1,302

(*a*) These are blocks.
(*b*) Inclusive of 10 villages in Ballia.
(*c*) This represents 24 square miles for cadastral survey and 27 square miles for topographical; the latter figures include 14 square miles of overlap in the Ballia district.
(*d*) Including 20 portions, of which 10 are in Ballia.
(*e*) Including 14 square miles overlap in Ballia.
(*f*) Including 4 portions of villages.
(*g*) Inclusive of 75 linear miles in the topographical area, and exclusive of 315 blocks re-surveyed and 1,676 *partal* lines through village sites.
(*h*) Including 614 sheets on 64″ scale; village sites; also including 46 sheets, 16″ scale, topographical.
(*i*) Exclusive of 603 blocks re-surveyed and 1,690 *partal* lines through villages sites.
(*j*) Inclusive of 640 sheets on 64″ scale; village sites.
(*k*) These are portions.
(*l*) Represents 2 square miles for cadastral and 8 square miles for topographical.
(*m*) Included in Saran traversing.
(*n*) Includes 21 linear miles test survey in topographical area.
(*o*) Five cadastral sheets and 13 topographical sheets.
(*p*) Fifteen blocks independently re-surveyed.
(*q*) Ten sheets 64″ scale and eight sheets 16″ scale.

R. CRICHTON, *Captain*, I.S.C.,
Supdt. of Settlement-Surveys, Bengal.

Statement showing the sums expended on each descrip

Description of Work.	TEMPORARILY-SETTLED AND GOVERNMENT ESTATES.																PRIVATE	
	CHITTAGONG DIVISION.				BURDWAN DIVISION.												PATNA	
	NOAKHALI.				MIDNAPUR—TEST SURVEY.				SARAN.				SARAN—DIARA TOPOGRAPHICAL.				DAR	
	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.
	1				2				3				4				5	
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Demarcation	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Marking stations	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,278	127
Traversing	...	...	...	...	...	...	...	...	2,270	220	99	2,589	2,554	255	112	2,921	18,085	1,794
	...	...	...	...	...	...	...	...	2,270	220	99	2,589	2,554	255	112	2,921	19,363	1,921
Survey, cadastral	271	27	12	310	...	...	...	...	27,933	2,970	1,228	31,931	616	62	27	705	38,152	3,805
Completion of field maps ...	...	...	...	...	...	...	...	...	3,136	314	138	3,588	...	...	...	...	407	39
Area extraction	...	...	...	...	...	...	...	...	7,001	700	308	8,009	13	1	1	15	8,080	
Traces	...	...	...	...	...	...	...	...	3,622	361	159	4,142	5	...	...	5	1,35	
	271	27	12	310	...	...	...	...	41,692	4,145	1,833	47,670	634	63	28	725	4	
Record of rights (khanapuri)	499	50	22	571	...	...	...	...	28,114	2,791	1,236	32,141	...	...	...	...	32	
Completion of records	...	...	...	...	...	...	...	...	16,448	1,635	723	18,806	...	...	...	...	14	
Statistics	...	...	...	...	...	...	...	...	6,062	606	267	6,935	...	...	...	...	2	
	499	50	22	571	...	...	...	...	50,624	5,032	2,226	57,882	...	...	...	...	50,221	
Arrears traversing	...	...	...	...	26	3	1	30	1,256	120	55	1,431	...	...	...	...	2,238	
Do. survey, cadastral ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	936	
Do. completion of maps ...	...	...	...	...	...	...	...	...	28	3	1	32	...	...	...	...	...	...
Do. area extraction ...	...	...	...	...	74	7	3	84	35	3	2	40	...	...	...	...	134	13
Do. traces	...	...	...	...	18	2	1	21	28	3	2	33	...	...	...	...	160	16
Do. khanapuri	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,041	104
Do. completion of records	515	52	22	589	256	26	12	294	94	9	4	107	...	...	...	...	3,006	290
Do. statistics	...	...	...	...	29	3	1	33	30	3	2	35	...	...	...	...	228	23
"Badar" establishment ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,276	128
	515	52	22	589	403	41	18	462	1,471	141	66	1,678	...	...	...	...	9,019	887
Total ...	1,285	129	56	1,470	403	41	18	462	96,057	9,538	4,224	1,09,819	3,188	318	140	3,646	1,26,598	12,560

DIX II.

tion of work in each district in Bengal during season 1897-98.

STATES.

DIVISION,

BHANGA.		DARBHANGA—DIARA TOPOGRAPHICAL.				DARBHANGA REVISION.				MUZAFFARPUR.				MUZAFFARPUR—DIARA TOPOGRAPHICAL.			
Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.
		6				7				8				9			
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
56	1,461	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
795	20,674	...	...	...	...	...	...	...	...	190	19	8	217	757	76	33	866
851	22,135	...	...	...	...	...	...	...	...	190	19	8	217	757	76	33	866
1,678	43,635	...	...	...	...	...	...	...	...	94	10	4	108	97	10	5	112
18	464	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
355	9,235	...	...	...	...	...	...	...	...	2	...	...	2	2	...	...	2
59	1,541	...	...	...	...	...	...	...	...	1	...	...	1	1	...	...	1
2,110	54,875	...	...	...	...	...	...	...	...	97	10	4	111	100	10	5	115
1,437	37,371	...	...	...	...	2,356	236	104	2,696	117	12	5	134	...	...	...	...
641	16,667	...	...	...	...	...	...	...	...	2	...	...	2	...	...	...	...
130	3,373	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2,208	57,411	...	...	...	...	2,356	236	104	2,696	119	12	5	136	...	...	...	...
98	2,555	...	...	...	...	...	...	...	...	9	1	1	11	...	...	...	...
41	1,071	15	2	1	18	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6	153	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7	183	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
46	1,191	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
132	3,428	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10	261	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
57	1,461	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
397	10,303	15	2	1	18	...	...	...	...	9	1	1	11	...	...	...	...
5,566	1,44,724	15	2	1	18	2,356	236	104	2,696	415	42	18	475	857	86	38	981

APPENDIX

Statement showing the sums expended on each description of work

Description of Work.	PRIVATE ESTATES—*concluded.*				WARDS' ESTATES.							
									PATNA DIVI			
	CHAMPARAN.				GAYA—TIKARI WARD'S ESTATE.				MONGHYR—NARHAN WARD'S ESTATE.			
	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.
	10				11				12			
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Demarcation	...	...	...	...	...	...	...	...	...	...	...	...
Marking stations	...	...	...	...	...	...	...	...	...	...	...	...
Traversing	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...
Survey, cadastral	...	...	...	...	...	...	...	...	...	...	...	...
Completion of field maps ...	...	...	...	...	...	...	...	...	...	...	...	...
Area extraction	...	...	...	...	...	...	...	...	...	...	...	...
Traces	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...
Record of rights (khanapuri)	...	...	...	...	...	...	...	...	...	...	...	...
Completion of records	...	...	...	...	...	...	...	...	...	...	...	...
Statistics	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...
Arrears traversing	90	9	4	103	241	24	11	276	33	4	1	38
Do. survey, cadastral ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. completion of maps ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. area extraction ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. traces	...	...	...	...	...	...	...	...	...	...	...	...
Do. khanapuri	...	...	...	...	...	...	...	...	...	...	...	...
Do. completion of records ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. statistics	...	...	...	...	...	...	...	...	...	...	...	...
"Badar" establishment ...	...	...	...	...	...	...	...	...	...	...	...	...
	90	9	4	103	241	24	11	276	33	4	1	38
Total ...	90	9	4	103	241	24	11	276	33	4	1	38

II—*continued.*

in each district in Bengal during season 1897-98—continued.

MISCELLANEOUS.

SION—*contd.*

DARBHANGA—SOMASTIPUR MUNICIPALITY.				MUZAFFARPUR—MANIKPUR —SADIPUR.				MUZAFFARPUR—GOBINDPUR (TERA RASIA).				PATNA RAILWAY GHAT SURVEY.			
Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.
13				14				15				16			
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
93	9	4	106	...	...	...	...	...	...	...	...	...	...	...	...
93	9	4	106	...	...	...	...	...	...	...	...	...	...	...	...
440	44	19	503	...	...	...	...	82	9	4	95	132	14	6	152
31	3	1	35	...	...	...	...	...	...	...	...	...	...	...	...
18	2	1	21	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
49	49	21	559	...	...	...	...	82	9	4	95	132	14	6	152
	2	1	19	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16	2	1	19	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	17	2	1	20	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	17	2	1	20	...	...	...	...	...	...	...	...
598	60	26	684	17	2	1	20	82	9	4	95	132	14	6	152

APPENDIX

Statement showing the sums expended on each descrip

MISCELLANE

Description of Work.	PATNA DIVISION—*concld.*				BHAGALPUR DIVISION.				ORISSA DIVISION.			
	SHAHABAD—KACHUAR MAHAL.				BHAGALPUR—PURNEA-NIPAL BOUNDARY.				ORISSA REVISION.			
	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.
	17				18				19			
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Demarcation	390	39	17	446	1,596	160	70	1,826	...	...	...	...
Marking stations	...	...	...	...	...	...	...	...	...	...	...	...
Traversing	...	...	...	...	...	...	...	...	...	...	...	...
	390	39	17	446	1,596	160	70	1,826	...	...	...	...
Survey, cadastral	...	...	...	...	...	...	...	...	...	...	...	...
Completion of field maps ...	...	...	...	...	...	...	...	...	...	...	...	...
Area extraction	...	...	...	...	...	...	...	...	...	...	...	...
Traces	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...
Record of rights (khanapuri) ...	...	...	...	...	...	...	...	...	...	...	...	...
Completion of records ...	...	...	...	...	...	...	...	...	...	...	...	...
Statistics	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...
Arrears traversing	...	...	...	...	...	...	...	...	19	2	1	22
Do. survey, cadastral ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. completion of maps ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. area extraction ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. traces	...	...	...	...	...	...	...	...	...	...	...	...
Do. khanapuri	...	...	...	...	...	...	...	...	...	...	...	...
Do. completion of records	...	...	...	...	...	...	...	...	...	...	...	...
Do. statistics	...	...	...	...	...	...	...	...	...	...	...	...
"Badar" establishment ...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	19	2	1	22
Total ...	390	39	17	446	1, 9	160	70	1,826	19	2		22

II—*concluded.*

tion of work in each district in Bengal during season 1897-98—concluded.

OUS—*concluded.*

BENGAL DRAWING OFFICE.												TOTAL.			
BIHAR "BADARS."				ORISSA "BADARS."				CHAKLA ROSNABAD "BADARS."							
Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.	Actual cost.	Superintendent's pay and office.	Four per cent. charge for instruments.	Total.
20				21				22				23			
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

APPENDIX III.

Statement showing the rate per square mile of the several processes of survey in Bengal during season 1897-98.

Description of work.	Temporarily-settled and Government estates.	Private estates.					Remarks.
	Chittagong Division.	Patna Division.					
	Noakhali.	Saran.		Darbhanga.	Muzaffarpur.		
	Cadastral.	Cadastral.	*Diara* topographical.	Cadastral.	Cadastral.	*Diara* topographical.	
1	2	3	4	5	6	7	8
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
Demarcation	...	...	...	...	...	...	
Marking station	...	... (*a*)	... (*a*)	2·44	... (*a*)	... (*a*)	(*a*) Rate included in traversing.
Traversing	...	108·04	108·04	34·57	108·30	108·30	
Cost rate traverse ...	...	108·04	108·04	37·01	108·30	108·30	
Survey, cadastral	30·16	57·53	25·63	59·53	72·00	28·00	
Completion of field maps ...	... (*b*)	6·47	... (*b*)	0·68	... (*b*)	... (*b*)	(*b*) Rate included in survey cadastral.
Area extraction	1·17	14·43	0·55	12·60	1·34	0·50	
Traces	...	7·46	0·18	2·10	0·66	0·25	
Cost rate cadastral survey ...	31·33	85·89	26·36	74·86	74·00	28·75	
Record of rights (khanapuri)...	55·54	57·91	...	50·98	89·33	...	
Completion of records	4·86	33·88	...	22·74	1·33	...	
Statistics	... (*c*)	12·50	...	4·60	... (*c*)	...	(*c*) Rate included in completion of records.
Cost rate records ...	60·40	104·29	...	78·32	90·66	...	
Cost rate cadastral and records	91·73	190·18	26·36	153·18	164·66	28·75	

APPENDIX IV.

Return of Inspections of survey and khanapuri by Survey Officers and Inspectors during season 1897-98.

Number of party.	Division.	District.	Inspecting Officer.	Survey.			Khanapuri.				Remarks.
				Area surveyed in square miles.	Number of villages inspected.	Number of linear miles of test survey.	Number of fields *khanapuri*.	Number of villages inspected.	Number of entries tested.	Percentage of entries checked.	
1	2	3	4	5	6	7	8	9	10	11	12
No. 4 Party (Bihar).	Patna ...	Saran	Mr. A. W. Smart	582·72	48	1,207	1,180,871	30	301	27·50	
			,, E. F. Berkeley... ...		50	55		109	1,539		
			,, C. S. Gasper		54	10		...	...		
			,, P. L. Causeley ...		145	84		160	2,777		
			,, H. H. Taylor		155	162		203	2,249		
			Inspectors		908	1,605		908	317,834		
			Total ...	582·72	1,360	3,123	1,180,871	1,410	324,700	27·50	
		Darbhanga	Mr. C. S. Kraal	732·54	48	228	1,100,808	32	197	26·00	
			,, C. G. Lee		318	381		208	5,026		
			,, T. W. Babonau ...		111	170		81	2,201		
			Babu Nimoni Chatterji		232	480		181	2,681		
			Inspectors		965	1,918		965	276,103		
			Total ...	732·54	1,674	3,177	1,100,808	1,467	286,208	26·00	
		Muzaffarpur	Mr. A. W. Smart	5·34	...	6	250	...	...	24·00	
			,, H. H. Taylor		10	13		...	...		
			Inspector		15	10		15	60		
			Total ...	5·34	25	29	250	15	60	24·00	
		Darbhanga (Somastipur Municipality).	European Officers and Inspectors.	2·00	7	(*a*) ...	5,074	7	375	21·00	(*a*) Fifte block resu veyed as te surveys.
			Total ...	2·00	7	...	5,074	7	375	21·00	
		Muzaffarpur (Gobindpur Tera Rasia).	European Officers and Inspectors.	3·00	1	4	...	...	...	...	
			Total ...	3·00	1	4	...	...	...	...	
Detachment ...	Chittagong.	Noakhali	Inspector	10·28	6	53	4,254	6	1,332	31·00	
			Total ...	10·28	6	53	4,254	6	1,332	31·00	

R. CRICHTON, Captain, I.S.C.,
Superintendent, Settlement-Surveys, Bengal

Report showing progress of 2-inch mapping in Bengal Drawing Office during the year ending 30th September 1898.

I. The superintendence during the year under report was under the Assistant Surveyor-General in charge of the head-quarters Drawing Offices.

Administrative.

II. The cadastral maps dealt with during the year under report were those of Bihar, Orissa, and Chittagong. For Bihar 1,672 cadastral maps were received during previous years, and were reduced by pentagraph to the scale of 2 inches = 1 mile for the completion of the standard sheets; there were received during the year 1,062 maps. The reduction of 4,864 cadastral maps of Orissa, received during previous years, to the scale of 2 inches = 1 mile, was completed during the year under report, which completed the reduction of the Orissa maps. From Chittagong 3,264 cadastral maps were received, of which 1,120 were reduced to the scale of 2 inches = 1 mile, the total number of sheets dealt with of Chittagong reached 1,844, of which 727 were received during previous years.

Maps dealt with.

Personnel.

Mr. E. P. S. Hill, in charge from 1st October 1897 to 13th April 1898.
Mr. A. B. Smart, from 14th April to 30th September 1898.
Mr. P. K. Vaughan, from 1st October to 5th November 1897.
Mr. C. C. Byrne, from 18th April to 30th September 1898.

Permanent Establishment.

6 Draftsmen.

Temporary Establishment.

6 Computer, writer, &c.
5 Draftsmen.

III. For Bihar 44 sheets have been outlined and completed (Statement C). The interior details of 56 were examined, and 16 were finally examined and forwarded to the Photo. Office for reduction to the scale of 1 inch = 1 mile. The outlining of 56 sheets has yet to be dealt with, though several have been plotted and the details of a number reduced by pentagraph. The publication of the Orissa standard maps has for some time been brought to a standstill, owing to numerous unsettled boundary disputes and the non-return of the proof sheets from the settlement authorities. The outlining of four sheets was completed during the year under report. The publication of the Chittagong standard maps will be taken in hand during the current year.

Publication of standard maps.

The special publication of 26 sections on the scale of 2 inches = 1 mile of the Orissa standard sheets containing irrigated areas, called for by the Government of Bengal, have not yet been published owing to the numerous additions that are being made to them at the request of the Canal Department.

Special publication of 2-inch sheets.

For six districts of Bihar, viz., Muzaffarpur, Saran, Champaran, Gaya, Monghyr, and Darbhanga, and three districts of Eastern Bengal, viz., Noakhali, Midnapore and Chittagong. From the six districts of Bihar the *badars* of 3,036 villages were received during the year under report, of which 2,889 were corrected and disposed of; the total number of Bihar villages the *badars* of which were disposed of reached 3,699, of which 810 were received during previous years, leaving a balance of 147 villages to be dealt with during the current year. In addition to correcting the maps and area statements, a portion of the *badar* establishment has been employed from time to time on the transliteration of the village names and the preparation of traces of disputed boundaries for submission to the camp officers.

"Badars."

From the three districts of Orissa the *badars* of 1,072 villages were received, and there remained to be dealt with 42 villages the *badars* of which were received during previous years. The total number of villages the *badars* of which were disposed of during the year under report was 512, leaving a balance of 602 to be dealt with during the current year.

A. E. SPRING,

Assistant Surveyor-General,
in charge, Bengal Drawing Office.

APPENDIX V.

A.

Statement showing Orissa Badar works done during the year ending 30th September 1898.

	District.		
	Balasore.	Cuttack.	Puri.
1	2	3	4
Balance in hand on 1st October 1897	42	...	...
Number of villages received during the year ...	1,037	30	5
Total receipts ...	1,079	30	5
Number of villages corrected during the year ...	477	30	5
Balance in hand ...	602	...	...
Details.			
Number of villages—			
Area statements corrected	477	30	5
Badar traces corrected for Settlement Officer ...	216	22	2
Areas corrected for Settlement Officer ...	219	22	2
Offsets corrected	168	30	2
Of boundary disputes traces prepared and sent to Settlement Officer for settlement.	225	...	...

B.

Statement showing Badar works done during the year ending 30th September 1898.

	Bihar.						Bengal.			Total.	Remarks.
	Muzaffarpur.	Saran.	Champaran.	Gaya.	Darbhanga.	Monghyr.	Noakhali.	Midnapore.	Chittagong.		
1	2	3	4	5	6	7	8	9	10	11	12
Balance on 1st October 1897	374	344	92	...	...	...	...	...	...	810	
Received during the year	608	1,054	365	8	22	28	11	128	2	2,226	
Total ...	982	1,398	457	8	22	23	11	128	2	3,036	
Corrected ditto	949	1,378	416	8	3	23	...	107	...	2,889	
Balance in hand	33	20	41	...	19	...	11	21	2	147	

Note.—1. Sixty *badars* of Muzaffarpur, Champaran, Saran, and Midnapore employed the staff for months.
2. The transliteration of village names have been entered in all 16-inch sheet of district Champaran.
3. Boundary dispute traces prepared and sent to camp officers.

C.

Statement showing progress of 2inch mapping during 1897-98.

Province.	Total number of sheets.	Graticules projected.	Stations plotted.	Details reduced by pentagraph and transferred to 2-inch sheets.	Numbers of villages, streams, &c., typed.	Outlining completed.	Foot-notes, margins, &c., completed.	Examined.	Finally examined.	Sent to Photo Office for reduction to 1-inch scale.	Proofs examined.	Final press order given.
1	2	3	4	5	6	7	8	9	10	11	12	3
Orissa.												
Previously reported	124	124	121	114	114	114	114	114	114	88	88	12
Completed during the year, including Khurda	...	...	3	10	10	4	...	...	...	...	...	...
Total to 30th September 1898 ...	124	124	124	124	124	118	114	114	114	88	88	12
Bihar.												
Previously reported	116	67	59	33	28	24	...	...	...	...	...	...
Completed during the year	8	51	59	71	64	44	40	56	16	16	...	...
Total to 30th September 1898 ...	124	118	118	104	92	68	40	56	16	16	...	...

D.

Statement showing maps on scale 2″=1 mile prepared by order of the Under-Secretary to the Government of Bengal in the Irrigation Department in his letter No. 853I., dated 31st July 1893.

Serial number.	Sheet number.	Sections.	Proofs.	Remarks.
1	2	3	4	5
1	196	4	4 Black print—1st proof 17th May 1897, 2nd proof 16th October 1898.	
2	195	4	4 Black print—1st proof 21st May 1897, 2nd proof 16th October 1898.	
3	222N.W.S.W.	2	2 Black print—1st proof 21st May 1897, 2nd proof 24th September 1898.	
4	223N.W.S.W.	2	2 Black print—1st proof 21st May 1897, 2nd proof 24th September 1898.	
5	220S.W.	1	1 Black print—1st proof 14th June 1897, 2nd proof 19th November 1897.	
6	221N.W.S.W.	2	2 Black print—1st proof 21st May 1897, 2nd proof 30th March 1898.	
7	194	4	4 Black print—1st proof 3rd July 1897 and 22nd November 1897, 2nd proof 19th November 1897.	
8	192S.E.	1	1 Black print—1st proof 23rd June 1897, 2nd proof 1st April 1898.	
9	165S.E.	1	1 Black print—1st proof 30th November 1897, 2nd proof 22nd April 1898.	
10	193	4	4 Black print—1st proof 14th June 1897, 2nd proof 16th October 1897, 3rd proof 11th February 1898.	
11	166N.E.	1	1 Black print—1st proof 7th December 1897, 2nd proof 12th January 1898.	

E.

Statement showing cadastral maps received, pentagraphed and remaining to be pentagraphed to 2″ = 1 mile scale during survey year 1897-98.

Province.	Number of maps received during year ending 30th September 1898.	Number of maps reduced by pentagraph.	Remaining for reduction.	Remarks.
1	2	3	4	5
Bihar ...	1,062	(*a*)1,672	1,062	(*a*) Received during previous years, but reduction made during year under report.
Orissa (Khurda) ...	...	(*a*)4,864	...	
Chittagong ...	3,264	(*a*)727 1,120	2,144	

R. T. CRICHTON, Captain, s.c.,

Superintendent, Settlement-Surveys, Bengal.

C A. P. & others.—Reg. No. 4034J & 4871J—300-7-2-99.

No. 124A.

FROM F. A. SLACK, ESQ.,

Secretary to the Board of Revenue, L.P.,

TO THE SECRETARY TO THE GOVERNMENT OF BENGAL,

REVENUE DEPARTMENT.

Dated Calcutta, the 8th February 1899.

LAND REVENUE.
(Surveys & Settlements.)

SIR,

THE HON'BLE MR. G. TOYNBEE.

I AM directed to submit, for the information of Government, the reports of the Superintendent of Settlement-Surveys and of the Director of Land Records, Bengal, for the survey and settlement year ending on the 30th September 1898. These reports were due to the Board on the 15th December, but the latter was not received till the 16th January 1899.

2. The reports are full, and it is not necessary to do more than remark on the figures and subjects which are specially important.

3. The report of the Superintendent of Settlement-Surveys shows that the programme of the year was fully carried out. The area for which cadastral survey and record-writing was completed was 1,302 square miles, of which 1,288 were in Saran and Darbhanga, 10 in Noakhali, and small areas elsewhere. Traverse survey was completed for 661 square miles. The average cost, per square mile, of cadastral survey and record-writing is shown below:—

	Noakhali.	Darbhanga.	Saran.
	Rs.	Rs.	Rs.
Survey	31	75	86
Record-writing	60	78	104

The cost of survey varies according to the size of the fields; the cost of record-writing similarly varies, but in Saran it was specially raised by the large number of private divisions of proprietary rights. The costs shown above are exclusive of traverse survey, and it does not appear that, except where the fields are large and the tenures are simple, it will be possible to reduce the cost of survey and record-writing to 4 annas per acre. There has been a considerable reduction in the cost compared with the preceding year, but the figures for that year were affected by the reduction of establishments owing to the famine.

4. The Survey Department continued to work harmoniously with the Settlement Department. The Settlement Officers exercise a joint control over the survey establishment, especially in regard to record-writing. The system has been gradually elaborated, and several improvements were introduced during the year. As regards survey, the amin is retained throughout the year under a regular bond, and is responsible for the completion of all his papers. The draftsmanship is better than formerly, and the Deputy Surveyor-General has noted the improvement in this branch of the work. The work in the field has been reduced by the omission from the maps of subdivisions other than real boundaries. Better arrangements have been made for the survey of large villages, and an improved form of *parcha* slip for the record of areas has been introduced. The preparation of *khewats* has been made over to the survey inspectors instead of to the amins. This work continues to give trouble, as the Collectorate registers on which they are based are incomplete and the proprietors are backward in giving information. In the case of four villages in Saran the proprietors could not be traced at all. Another improvement effected in the procedure is that disputes as to occupancy and boundaries arising during record-writing are now dealt with by Kanungos as well as by Assistant Settlement Officers, with the result that a much higher number are disposed of in the field before the records are made over to the Settlement Department.

5. The arrangements for the survey of the district boundaries and of village boundaries, when the village lies in two districts, are approved by the Board. The former question has come before the Board in connection with the survey of Saran *diara* lands which adjoin the Patna district.

6. The subject of correcting the village maps is being separately discussed. A large amount has been included in the budget for 1899-1900 in connection with the Orissa and Chittagong maps. It appears that in these areas the corrections were delayed, and difficulties have therefore arisen. It is satisfactory to see that this defect is being provided against in Bihar. The Superintendent of Settlement-Surveys has promised to submit a full report on the subject as regards Orissa and Chittagong.

7. Good work is being done in the training of junior civilians, and the system has been still further elaborated in the rules framed by the Settlement Officer of North Behar, which have been recently approved by Government.

8. The system adopted for the survey of the small areas in Noakhali deserves special notice. It secures a survey, bearing a professional guarantee of accuracy, at a slight cost. Proposals are now under consideration with reference to the introduction of a scheme for carrying out provincial surveys (*vide* G. O. No. 783, dated 31st December 1898). The Director of Land Records proposes to defer his report on the proposals until orders have been passed by Government for the extension of the survey in North Behar and Backergunge. The experiment in Noakhali shows that the proposed scheme would be useful for all petty surveys.

9. The feature of the work in Saran was the large number of disputes which arose during record-writing. There were 35,625 disputes affecting 89,772 fields. Thus there were disputes in about 8 per cent. of the fields. They cannot, however, have been very serious, as more than two-thirds of them were disposed of by the Assistant Settlement Officers and Kanungos. In Darbhanga there were disputes in about 6 per cent. of the fields, and the great majority were decided in the field. One zamindar has given great trouble by obstructing the work, and the Settlement Officer proposes (*vide* page cxxiii of the Appendices to the Report of the Director of Land Records) to levy costs from him at a rate higher than that imposed on the rest of the district. A reference to the Collector might have been effective.

10. The difficulties in laying the boundary of the Kachnar Mahal in Shahabad are remarkable, and it would appear that the district authorities are to blame. The Board will ask for a special report on this subject.

11. Paragraphs 67 to 73 of the report do not affect the Board.

12. The report of the Director of Land Records shows that the work of the past year was as below:—

1	2	3	4	5	6
Total area under settlement of revenue or record-of-rights.	Area for which records were written during 1897-98.	Area for which records were attested and existing rents recorded during 1897-98.	Number of tenants whose rents were settled during 1897-98.	Number of villages for which final records were published in 1897-98.	Expenditure of Settlement Department during 1897-98.
Square miles.	Square miles.	Square miles.			Rs.
13,497	1,293	1,527	45,845	2,746	4,39,598

13. The main features of the work during the year under report are the completion of the Chittagong settlement, the practical completion of the Orissa settlement (except as to fixing the Government revenue for half the Province), and of the settlement work in Muzaffarpur and Champaran. The final reports of 10 minor settlements have been submitted to the Director. These include the report of the settlement of the Palamau Government estates, with an area of 294 square miles; the Darjeeling Terai (230 square miles); the Tikari and the Belkhara wards' estates in Gaya (482 square miles), and the Government estates in Gaya with an area of 102 square miles. Among the minor settlements mentioned in paragraph 2 of the Director's report, the Board have received and disposed of the final report of the Chaurasi estate in the 24-Parganas, and of the Government and ward's estates in Backergunge mentioned in paragraph 4 of the report. The final reports of the other settlements

mentioned in paragraph 2 of the report have not yet been received by the Board.

In Chittagong the Board have dealt with the question of the work remaining to be done for the disposal of the records.

In Orissa the field-work and settlement of rents are practically completed, but a year's work remains to be done in the disposal of cases and final reports and assessment. The programme of work appears to have been carried out, but there was some delay on account of the necessity of re-attesting the records, before the settlement of fair rents, in areas of which the initial record was prepared some years ago.

14. The results of the assessment of Government revenue in temporarily settled estates and Government estates up to the end of the year, as far as can be gathered from the report, are as follow:—

	Total number of estates.	Number of estates assessed.	Previous revenue.	New revenue.	Increase.	Increase per cent.
1	2	3	4	5	6	7
			Rs.	Rs.	Rs.	
Orissa	6,244	3,855	8,36,387	13,12,750	4,76,363	57
Chittagong ...	Completed		3,64,890	5,49,043	1,84,153	50·47
Darjeeling Terai ...	Ditto		93,197	1,13,222	20,025	21·48
Pataspur ...	Ditto		34,078	42,253	8,175	23·99
Jaipur	Ditto		39,872	51,068	11,196	28
	Acres.	Acres.				
Backergunge ...	37,452	21,104	1,02,432	1,11,361	8,929	8·7
Noakhali ...	...	...	46,238	63,041	16,803	36·3

In 1897, the Director of Land Records (Mr. Macpherson), estimated that the increase of revenue would be more than 50 per cent., or 6½ lakhs. It will be seen that this estimate is being worked up to. At the same time the estimate of the Government of India, in paragraph 17 of their letter to the Government of Bengal, No. 2397-192-2, dated the 13th October 1897, of an increase in the Government demand by 56 to 68 per cent. has not been attained. It is expected that the revenue assessment work in Orissa will be completed before the April kist of 1899. It is very satisfactory to note that the new revenue introduced in April 1898 has been practically paid up in full. Up to the end of October there were only 5 cases of recusancy involving a revenue of Rs. 1,05,834, of which Rs. 1,04,312 was on account of the Kotdesh estate. This estate was recently sold for arrears of revenue, but a suit was instituted to set aside the sale, and during the confusion as to ownership, the new proprietors were unable to collect the rents. Several cases have been referred to the Board for sanction of the assessment where it has been proposed to take either more or less than the standard percentage. The Board have been very favourably impressed with the complete manner in which the final reports have been drawn up and with the clear statements which have been prepared of the assets on which the assessments are to be fixed.

15. The increase of Government revenue in Chittagong appears, from the statement in page xlii of the Appendices to the Report, to be 50 per cent. The decision in the case now before the High Court as to the rights of the *Noabad* talukdars will have an important bearing on the settlement

16. With regard to the estates Basudeb Ray and Kali Sankar Sen in Faridpur, Dacca, and Backergunge, mentioned in paragraph 29 of the Director's report, the Board have already explained the facts to Government in their letter No. 799A., dated the 16th July 1897. Further difficulties have since arisen in the course of the revision of the settlement from the fact that the lands of the Government estates are intermingled with the lands of private estates, and it is not possible to identify them. There was a further difficulty in providing funds for the work during the current year and the proceedings have, therefore, been temporarily suspended.

17. The operations in North Bihar have made good progress under the able supervision of Mr. Stevenson-Moore and his staff. These officers have brought the Settlement Department to a high state of efficiency, and the programme of work was fully carried out. The work lay chiefly in Saran and Darbhanga where proprietary rights are greatly sub-divided, and the areas of fields and holdings are small, while the number of disputes as to boundaries and occupation are great. Special attention has been paid to the supervision of the initial record-writing, and the officers of the Settlement Department dispose of disputes while this is in progress. Work has also been facilitated by the preparation of area slips by the Survey Department while in recess, so that they can be communicated to landlords and tenants before attestation.

18. The report of the Settlement Officer of North Bihar (Appendix VI, page lxvi of the Report), brings to notice several points which will have the attention of the Board. With regard to paragraph 14 of this Appendix the Board will consider the necessity of issuing instructions for the guidance of officers conducting partition work in areas which have been surveyed and settled under the Bengal Tenancy Act.

19. So far as can be gathered from the report, the settlement of fair rents has resulted in a comparatively small increase. During the year under report, so far as rents were settled, the enhancement was in Muzaffarpur 7·7 per cent.; in Champaran 10·1 per cent.; in Saran 6·01 per cent., and in Darbhanga 8·3 per cent. The increase in Champaran was due to the extension of cultivation, and that in Saran was rendered possible by the existence of the records of a Government survey of the Hatwa Raj Estate in 1874, which enabled extension of cultivation to be proved. In Muzaffarpur the rate of increase would have been less, had it not been for the decision of the Special Judge, accepting compromises which gave a considerable enhancement in certain cases (paragraph 6, page lxxii of the Report). The largest number of settlement cases was in Saran, where 18·9 per cent. of the tenancies were dealt with under section 104 of the Bengal Tenancy Act.

20. With regard to the right of transfer of holdings (which is a subject of controversy and affects the question of the working of the Land Records Maintenance Act), it appears that out of the holdings attested during the year, 5 per cent. in Champaran, 5·37 per cent. in Saran, and over 4 per cent. in Darbhanga, were found to be affected by sales or mortgages. The average price per acre, in the case of sales, was Rs. 17 in Champaran (due to famine), Rs. 81 in Saran, and Rs. 50 in Darbhanga. The average price for mortgages was about Rs. 20 higher in Champaran and Darbhanga and Rs. 40 in Saran. This is said to be due to the fact that, in the case of sales, the transferee has to pay a *salami* to the landlord in addition to the price of holding. In Saran the great majority of transfers (84 per cent.) related to portions of holdings. In Champaran, owing doubtless to the famine, the proportion of transfers was greater than in previous years, but in Saran and Darbhanga the great majority (68 to 84 per cent.) were to raiyats. These figures are interesting with reference to the subject of the Land Records Maintenance Act.

21. A very satisfactory point in the report is the facility with which the costs are being recovered. Of the demand of the year, 98 per cent. was collected in Muzaffarpur, 74 per cent. in Champaran, and 97·83 per cent. in Saran. The percentage of the cost of recovery fell from 6·5 to 4·1 in Muzaffarpur, from 8·6 to 4·9 in Champaran, and was 5·64 in Saran. The collections in Champaran were 99 per cent. of the raiyats' demand, but only 62 per cent. of the demand from the landlords was collected. With regard to the sum owed by the Bettiah Raj, it appears that up to the end of November the amount was Rs. 71,554, which the Manager proposes to pay in three instalments during the quarters ending December 1898, March 1899 and June 1899 respectively. A considerable number of certificates have been issued, chiefly on petty maliks and for abandoned holdings, the cost of which is to be paid by the landlords.

22. The Board are glad to observe that there is a prospect of the settlement of the estates of the Raja of Hill Tippera being completed within the current year. At the close of the year under report, about 500 cases for settlement of fair rents remained for disposal. Publication and the disposal of objections and disputes are being pushed on. The settlement of fair rents resulted in an increase of 20·66 per cent. in the case of *raiyati* holdings, and 60·5 per cent. in tenures. The total increase in rent up to the end of the year was Rs. 69,664. Good progress was made in the disposal of appeals, and out of 800 filed, the decision of the Settlement Officer has been upheld in 85 per cent., modified in 13·75

per cent., and reversed in 1·25 per cent. These results reflect great credit on the Settlement Officer, Mr. Cumming, and the officers working under him. It is satisfactory to note that the people have adopted a better attitude towards the proceedings, and that 83 per cent. of the demand of the year, on account of the costs of the proceedings, was realised during the first month in which collection commenced. The cost of realisation is high, viz., 9 per cent., but it will probably be reduced as the work goes on.

23. With regard to the matters referred to in paragraphs 6 to 14 of the Director's report the following may be noted:—

Paragraph 6.—The rules have been finally published, and the Director of Land Records has been requested to revise the Survey and Settlement Manual where necessary.

Paragraph 7.—The orders of the Government of India as to the court-fees on applications for settlements of fair rents have been notified in the *Gazette of India* of the 21st January 1899.

Paragraphs 8 and 9.—The Director of Land Records refers to the decision of the High Court in paragraph 9 as ruling that a second appeal lies to the High Court even against a decision settling a rent. It appears to the Board that the Director of Land Records has somewhat over-estimated the effect of the ruling. In the decision referred to, it will be seen that the Judges note that the language of sections 104 to 106 is confused, and that these sections give them jurisdiction in this special case. The Bengal Tenancy (Amendment) Act, III (B.C.) of 1898, makes the sections more precise, but it is not clear that all doubtful points have been removed. The language of section 109A(3), which says that a second appeal does not lie to the High Court in the case of "a decision settling a rent," is still vague. The Board are of opinion that no special notice need be taken of the High Court ruling referred to by the Director, and that the effect of the Amended Act should be awaited

Paragraph 10.— The Board forwarded the judgments in the cases referred to in this paragraph to Government with their letter No. 1062A, dated the 28th November 1898.

Paragraphs 11 to 14.—The action taken on the subjects mentioned in these paragraphs is known to Government, and it is not necessary to refer to them here.

24. In paragraph 18 of his report the Director says that the progress made in the work of assessment in Orissa, and the success which has attended it, reflects the greatest credit on Mr. S. L. Maddox, who, in his capacity of Settlement Officer, has had to deal personally with the assessment papers of every estate. The Board fully concur in this high praise, and also commend the work of the officers who served under Mr. Maddox.

25. In paragraphs 35 to 38 the Director says that the Settlement Officer, Mr. C. J. Stevenson-Moore, is devoting his energies to improving the system in North Bihar, and the Board agree fully with the Director as to the very capable manner in which this is being done.

26. The Board think that Mr. C. G. H. Allen, Settlement Officer of Chittagong, deserves the greatest credit for the successful way in which he has brought the settlement proceedings in Chittagong to a close. They would also bring to the notice of Government the excellent work done by Mr. J. G. Cumming in the settlement of the estates of the Raja of Hill Tippera.

27. The Board concur generally with the Director's remarks in regard to the other officers mentioned in paragraph 58 of his report.

28. The Board thank Captain R. T. Crichton, for the valuable assistance that he has at all times given to the Settlement Department. They also acknowledge, the efficient administration of the Settlement Department by Messrs. W. C. Macpherson and P. C. Lyon, during the past year, and thank both the Superintendent of Settlement-Surveys and the Director of Land Records and Agriculture for their clear and interesting reports.

I have the honour to be,

SIR,

Your most obedient servant,

F. A. SLACK,

Secretary.

W. S. S.—Reg. No. 6836J—576—2-3-99.

REVENUE DEPARTMENT.

LAND REVENUE.

CALCUTTA, THE 28TH MARCH 1899.

RESOLUTION—No. 1315.

READ—

Letter No. 124A., dated the 8th February 1899, from the Board of Revenue, submitting the Report of the Superintendent of Settlement-Surveys on Surveys, and of the Director of Land Records on Settlements in Bengal, for the year ending 30th September 1898.

The reports.

THESE reports, with the Board's review thereon, were due to Government on the 15th of January, but were not received till the 11th of February. The report of the Superintendent of Settlement-Surveys was received by the Board of Revenue on the due date, but that of the Director of Land Records was a month late.

Charge and inspection.

2. Captain R. T. Crichton was in charge of the survey operations throughout the year under report. The office of the Director of Land Records was held by Mr. W. C. Macpherson till the 22nd November 1897, on which date he was succeeded by Mr. P. C. Lyon who held charge for the remainder of the year. Captain Crichton was on tour for 192 days as compared with 124 days in 1896-97. Mr. Macpherson and Mr. Lyon together spent 147 days on tour, as against 113 days in the previous year.

3. The following table shows the general outturn and cost of survey-settlement work during the year under report and the three preceding years:—

YEAR.	Traverse survey.	Skeleton boundary survey.	Topographical survey.	Cadastral survey.	Record-writing.	Cost of survey.	Cost of settlement.	Total cost.
1	2	3	4	5	6	7	8	9
	Sq. miles.	Sq. miles.	Sq. miles.	Sq. miles.	Sq. miles.	Rs.	Rs.	Rs.
1894-95	3,091	23	1,026	2,786	3,120	6,04,304	6,97,135	13,01,439
1895-96	2,131	187	.....	2,429	2,478	4,29,091	10,00,017	14,29,108
1896-97	908	.....	410	845	845	2,20,142	11,45,019	13,65,161
1897-98	661	.....	35	1,302	1,302	2,73,994	9,66,924	12,40,918

NOTE.—The figures given above as to cadastral survey and record-writing in 1897-98 include 2 square miles of city survey in the Samastipur Municipality.

The cost rates of the surveys in different districts were as follow:—

DIVISION.	District.	Traverse survey.	Cadastral survey.	Record-writing.	Topographical survey.
1	2	3	4	5	6
		Rs.	Rs.	Rs.	Rs.
Chittagong ...	Noakhali	.....	31·33	60·40	.....
Patna ...	Saran	108·04	85·89	104·29	.....
	Do. (*diara*, topographical).	108·04	.....	.....	26·36
	Darbhanga ...	37·01	74·86	78·32	.....
	Muzaffarpur ...	108·30	74·00	90·66	.....
	Ditto (*diara*, topographical).	108·30	.....	.....	28·75

NOTE.—These cost rates have been calculated on the expenditure incurred on work done during the year in the area dealt with, exclusive of payments made on account of work done during the previous year.

The Superintendent of Settlement-Surveys explains that the high rates of traverse work in Saran and Muzaffarpur shown above are misleading. The total area traversed in the two districts was only 61 square miles; and as the traverse section was employed in these districts at the commencement of the season, the cost of the move from the recess quarters, and the pay of the section for October 1897, were debited to that small area. In Darbhanga the traverse survey extended over 598 square miles, and the cost of Rs. 37 per square mile is not high, considering the small size of the villages dealt with.

The total area cadastrally surveyed was 1,302 square miles, and the cost of cadastral survey and record-writing taken together was Rs. 2,37,297, giving an average cost rate of Rs. 182 per square mile. In 1896-97 the cost worked out to Rs. 211 per square mile, but this abnormally high rate was due to the general contraction of the survey programme in Bihar in consequence of the famine. It was considered undesirable to break up the establishment which had been so carefully collected, and the contraction of programme was accompanied by no corresponding reduction of establishment. The exceptionally low rate in Noakhali (Rs. 91·73 per square mile) was due to the largeness of the fields and to the smallness of the expenditure incurred on account of supervision, the Settlement Officer having supervised both survey and settlement work. In Saran the rate was high owing to the minute private divisions of proprietary rights and to the small size of the fields, which averaged only 0·30 of an acre each. Another important factor which contributed to the high rate in this district was the fact that a very considerable portion of the tract dealt with consisted of village sites which had to be surveyed on the 64-inch scale at ten times the ordinary cost rate. The rates in Darbhanga were moderate considering the difficulties encountered. Allowing however, for the circumstance that the famine had much to do (particularly in Saran) with the high cost rates of 1896-97, the Lieutenant-Governor considers that the fall in the cost of cadastral survey and record-writing from Rs. 271 to Rs. 190 in Saran, and from Rs. 166 to Rs. 153 in Darbhanga, is satisfactory so far as it goes, but it is observed that the cost rate was, owing to the diminution in the total area surveyed, higher in 1897-98 than in 1895-96 or any of the preceding years.

4. Several improvements in procedure were introduced during the year. Area slips which had previously only been granted to tenants were, during the year under report, also issued to landlords. The work of compiling the *khewats* was transferred, with successful results, from the amins to the Survey Inspectors. Another important and useful change was in the appointment of kanungos to assist Assistant Settlement Officers in dealing with disputes as to boundary or occupancy arising during record-writing. All minor disputes are thus disposed of before the records are made over to the Settlement Department. The officers of the Settlement Department continued to exercise a joint control over the survey establishment, especially in regard to record-writing, and the usual harmony between the two Departments was maintained.

Attitude of the people.

5. It is reported that in both Saran and Darbhanga great difficulty was experienced in inducing the tenants to attend during the survey stage, for the purpose of pointing out the limits of their fields. They were, however, eager to obtain their field lists at the final stage. There was at first some opposition in the villages belonging to Saran situated in the Ballia district, but it was soon removed by the Collector. In Noakhali no opposition was offered, though the people are said to have been apathetic at the commencement of the operations.

6. The following table shows the survey work done in each district in Bihar, season by season, since the commencement of the operations in 1891:—

Bihar Survey.

		Traverse Survey.		Cadastral Survey.		Record-writing.		Total cost of cadastral survey and record-writing.	Cost rate per square mile.			Cost of traverse and cadastral survey and record-writing per acre.	Expenditure on settlement.
		Area in square miles.	Cost.	Number of villages.	Area in square miles.	Number of villages.	Area in square miles.		Traverse survey.	Cadastral survey and record-writing (approximate).	Total cost (approximate).		
1		2	3	4	5	6	7	8	9	10	11	12	13
			Rs.					Rs.	Rs.	Rs.	Rs.	As.	Rs.
Muzaffarpur.	1891-92	1,247	43,290	.....	.....	.....	.....	.....	34·7	.....	.....	.....	.....
	1892-93	997	38,515	1,153	529	1,052	446	76,413	38·6	152·1	190·7	Nearly 5	34,301
	1893-94	Nil.	6,805	1,594	979	1,365	788	1,27,045	.....	146·3	.....	Over 3½	58,079
	1894-95. Original work ...	.....	2,840	664	658	987	938	1,19,078	.....	139·3	.....	Nearly 3½	1,28,342
	1894-95. Revision of Colonel Barron's survey.	.....	.....	650	410	650	410	45,765	.....	128·8	.....	Over 3	
	1894-95. Revision survey of Raj Darbhanga villages.	.....	.....	8	14	5	7	580	.....	73	.....	Nearly 2	
	1895-96. Original work ...	20	991	433	452	433	452	79,690	82·58	172·31	254·89	Over 6	1,80,057
	1895-96. Revision of maps and records of 1892-93.	.....	.....	9	7	9	7	503	.....	72·37	.....	Nearly 2	
	1895-96. Revision of maps and records of 1878-79.	.....	.....	3	7	3	7	1,074	.....	157·00	.....	Nearly 4	
	1896-97	2	401	2	2	2	2	3,961	.....	.....	.....	.....	1,19,174
	1897-98	10	1,094	5	2	5	2	247	109·4	123·5	232·9	Nearly 6	86,251
Champaran.	1891-92 ...	363	12,601	.....	.....	.....	.....	.....	34·7	.....	.....	.....	.....
	1892-93 ...	1,103	30,654	244	416	234	320	41,182	27·8	109·1	136·9	Nearly 3½	21 800
	1893-94 ...	1,320	50,498	325	517	354	599	71,494	38·3	129·2	167·5	Over 4	70,144*
	1894-95 ...	126	8,205	1,038	1,162	1,058	1,176	1,56,858	65·2	134	199·2	Nearly 5	57,670
	1895-96 ...	386	9,272	1,047	1,185	1,047	1,185	1,23,109	24·02	103·88	127·90	Over 3	1,21,102
	1896-97 ...	.....	216	.....	.....	.....	.....	3,098	.....	.....	.....	.....	87,860
	1897-98 ...	.....	103	.....	.....	.....	.....	.....	.....	.....	.....	.....	79,703
Saran ...	1892-93 ...	894	34,527	.....	.....	.....	.....	2,366	38·6	.....	.....	.....	.....
	1893-94 ...	932	34,273	1,260	549	1,229	527	65,200	35·8	119·2	156	Nearly 4	.....
	1894-95 ...	516	15,238	.....	.....	.....	.....	10,287	29·5	.....	.....	.....	36,460
	1895-96 ...	52	3,304	1,204	645†	1,234	669	93,548	56·00	147·17	203·17	Over 5	62,135
	1896-97 ...	60	5,359	330	210	330	210	56,837	89·31	270·65	359·96	Nearly 9	88,135
	1897-98 ...	51	6,941	877	555	877	555	1,05,799	136·09	190·6	326·69	8	1,04,676
Darbhanga.	1893-94 ...	518	16,340	.....	.....	.....	.....	.....	31·6	.....	.....	.....	.....
	1894-95 ...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1895-96 ...	1,179	27,344	14	16	14	16	1,678	23·20	103·37	126·57	Over 3	Cost included in Muzaffarpur.
	1896-97 ...	417	22,871	638	545	638	545	90,354	54·84	165·78	220·62	5½	17,089
	1897-98 ...	598	24,690	965	733	965	733	1,22,730	41·28	167·4	208·68	5	84,544
		10,791	3,96,372	12,463	9,593	12,491	9,614	13,98,198	.....	.....	.....	.....	.....
Total ...	1891-92 ...	1,610	55,891	.....	.....	.....	.....	.....	35	.....	.....	.....	.....
	1892-93 ...	2,994	1,03,696	1,397	945	1,286	786	1,19,961	35	139	174	Nearly 4½	56,101
	1893-94 ...	2,770	1,07,916	3,179	2,045	2,948	1,914	2,63,739	39	132	171	Over 4	1,28,223
	1894-95 ...	642	26,283	2,360	2,244	2,700	2,531	3,32,568	40	137	177	Nearly 4½	2,22,472
	1895-96 ...	1,637	40,911	2,710	2,312	2,740	2,336	2,99,602	46	126	172	,, 4½	3,63,294
	1896-97 ...	479	28,847	970	757	970	757	1,54,250	.....	.....	.....	,, 7	3,12,258
	1897-98 ...	659	32,328	1,847	1,290	1,847	1,290	2,28,776	49	177	226	Over 5	3,55,174
		10,791	3,96,372	12,463	9,593	12,491	9,614	13,98,896	.....	.....	.....	.....	14,37,522

The figures of the cost rates per square mile in the year 1897-98, shown in this statement, do not tally with those shown in the statement in paragraph 3 above, from which expenditure incurred in 1896-97, but paid for in 1897-98, is excluded.

(* Including Saran.)

† Includes 28 square miles of Majhauli Ward's estate, and excludes 11 square miles of river areas actually surveyed, but which, owing to the midstream boundary, belong to the North-Western Provinces.

Settlement.

7. The following statement shows the work done year by year in each district in North Bihar from the commencement of the settlement proceedings up to the close of the past settlement year:—

Bihar Settlement.

		Attestation.				Draft records published.	Settlement of fair rents under section 104 of the Bengal Tenancy Act.			Cases under section 105.		Cases under section 106.		Final records published.
		Area in square miles.	Number of villages.	Number of plots.	Number of tenancies.	Number of villages.	Number of cases disposed of.	Number of tenants affected.	Rents raised or lowered by decisions up to date.	Number of objections filed.	Number of objections disposed of.	Number instituted.	Number disposed of (inclusive of cases pending from previous years).	Number of villages.
1		2	3	4	5	6	7	8	9	10	11	12	13	14
Muzaffarpur	1892-93	66·	320	119,821	35,799	311	66	713	+ 18·88	926	868	363	187	.....
	1893-94	376·	712	487,099	150,069	696	117	2,273		3,235	3,029	952	840	.....
	1894-95	746·40	1,361	1,130,745	279,004	1,265	435	2,646		7,492	6,563	808	870	768
	1895-96	1,319·43	1,633	2,083,026	458,038	1,541	1,859	3,862		10,817	7,697	685	315	1,161
	1896-97	436·42	477	595,408	107,440	550	1,281	6,987		9,353	12,576	1,309	770	1,729
	1897-98	14·46	5	15,849	3,175	121	863	3,864		2,397	3,290	801	1,785	698
Champaran	1892-93	46·43	76	34,340	7,774	66	38	1,385	+ 9·19	48	48	40	27	.....
	1893-94	380·	231	323,511	61,022	300	184	15,720		2,356	2,226	206	203	49
	1894-95	491·45	372	470,660	73,695	251	323	17,896		1,690	1,697	320	328	252
	1895-96	1,162·	1,084	1,358,793	193,611	631	1,029	34,633		4,126	3,971	393	322	372
	1896-97	665·0	490	339,511	66,693	718	514	24,970		3,532	4,050	1,814	914	891
	1897-98	549·0	602	267,975	47,356	889	485	15,833		688	1,022	416	1,386	776
														.....
Saran	1893-94	19·	68	33,155	5,130	68	33	426	+ 10·85	1,084	947	41	31	
	1894-95	487·41	1,160	749,533	125,315	265	1,787	19,783		415	98	23	21	57
	1895-96	.....	.....	.....	.....	867	1,385	21,729		9,487	7,143	116	22	11
	1896-97	477·09	934	920,013	173,819	623	1,183	7,168		4,268	6,452	503	256	998
	1897-98	380·28	605	787,950	144,610	797	786*	8,522		9,031	8,681	834	678	912
Darbhanga	1897-98	533·52	621	1,038,442	197,374	585	300	1,114	+ 8·10	6,985	5,121	48	1	24
Total	1892-93	112·43	396	154,161	43,573	377	104	2,098	.....	974	916	403	214	.....
	1893-94	775·	1,011	843,765	216,221	1,064	334	18,419	.....	6,625	6,202	1,198	1,074	.....
	1894-95	1,725·26	2,893	2,350,938	478,014	1,781	2,545	40,325	.....	9,597	7,763	1,151	1,219	1,072
	1895-96	2,481·43	2,717	3,441,819	651,649	3,039	4,273	60,224	.....	24,430	18,811	1,194	659	1,544
	1896-97	1,578·51	1,901	1,854,927	347,957	1,891	2,978	39,125	.....	17,153	23,078	3,626	1,940	3,618
	1897-98	1,477·26	1,833	2,110,216	392,515	2,392	2,434	29,333	.....	19,101	18,114	2,099	3,850	2,410
Grand Total		8,149·89	10,751	10,755,826	2,129,929	10,544	12,668	189,524	.....	77,880	74,884	9,672	8,956	8,644

* Including 44 review cases.

It appears that the number of tenancies of which records-of-rights were prepared and existing rents ascertained and recorded in Bihar alone exceeded two millions—a number which is more than double the entire number of tenants' holdings in Great Britain and Ireland together. Of these, fair rents were settled on application for 189,524 holdings, or for about 9 per cent. of the whole, the existing rents being left untouched in the case of the remaining 91 per cent. The rents of the limited number of tenancies for which fair rents were settled were enhanced by nearly 19 per cent. in Muzaffarpur, 9 per cent. in Champaran, nearly 11 per cent. in Saran, and 8 per cent. in Darbhanga, mainly in all cases on the ground of excess area. The reports of the Settlement Officer show that steady progress was made in all branches of the work and that the programme for the year was fully carried out.

8. Mr. C. J. Stevenson-Moore, I.C.S., was Settlement Officer of North Bihar throughout the year.

Muzaffarpur.

The district of Muzaffarpur, which has an area of 3,069 square miles, contains 4,505 villages with an estimated number of 1,036,000 tenants. At the beginning of the year under report the records of only five villages remained to be attested. These were finished, and the records of 121 villages were published in draft and those of 698 villages published finally, leaving a balance of only 21 villages for draft publication and 194 villages for final publication.

Six hundred and fifty appeals were filed before the Special Judge, of which 533 were decided, and the lower Court's orders were upheld in 380 cases, modified in 24, and reversed in 129. In this district, up to the 30th September 1898, fair rents had been settled for 20,345 tenants, their rents being raised from Rs. 1,92,411 to Rs. 2,28,750 or by 18·88. It is reported that during the year several compromises as to the amounts of fair rents which had been rejected

by the Assistant Settlement Officer on the ground that the enhancement agreed to in them was unfair and inequitable, were accepted by the Special Judge without any scrutiny. The effect has been to raise the existing rents considerably, and in one case an enhancement of 85 per cent. has been decreed. In the amending Act, III of 1898, it has been clearly laid down that no such compromises are to be accepted unless the Court is satisfied that terms and the rents agreed upon are fair and equitable. Fair progress was made in the revision and compilation of statistics, to which much time and attention were devoted, and which, it is stated, has proved a far heavier item of work than had been anticipated.

Champaran.

9. Mr. J. H. Kerr, I.C.S., Assistant Settlement Officer, was in immediate charge of the operations in Champaran for the greater part of the year.

The settlement operations include the whole district with the exception of an area of 250 square miles of hill jungle. The total number of villages settled is 2,860, and the estimated total number of tenants 450,156. Though the area of the district surveyed is 216 square miles larger than Muzaffarpur, it has less than half the number of tenancies and over a million fewer plots. The initial record-writing was completed before the beginning of the year under report. The appeals filed during the year against orders passed in section 106 cases numbered 571, bringing the total number up to 629, of which only 36 have been decided by the Special Judge. The Settlement Officer has made no comment on these figures. The Board are requested to report to what the congestion of work is due, and what measures should be taken to secure the speedy disposal of the numerous pending appeals. The decision of the lower Court was, in cases decided, upheld in 17, modified in 2, and reversed in 6, and 11 are reported to have been decided on compromise. The following table gives statistics of the settlement of fair rents in this district:—

Area attested in—	Number of tenants for whom fair rents were settled.	Former rental.	Fair rent settled.	Enhancement.	Percentage of enhancement.
1	2	3	4	5	6
		Rs.	Rs.	Rs.	
1893-94 ...	22,151	1,44,556	1,62,636	18,080	12·50
1894-95 ...	12,850	1,09,276	1,20,028	10,752	9·83
1895 96 ...	53,290	5,57,201	6,00,300	43,099	7·73
1896-97 ...	16,454	1,20,780	1,33,808	13,028	10·78
1897-98 ...	5,692	44,635	49,426	4,791	10·73
Total ...	110,437	9,76,448	10,66,198	89,750	9·2

The Settlement Officer writes:—

"These figures show clearly the enormous importance of our work under section 104 in Champaran. They will be further analysed and supplemented in the final report. It is sufficient to point out here that we have settled fair rents for over one-fourth of the raiyats' holdings in the district, and in my opinion we have thus conferred a benefit not only on the landlords, but also on the raiyats; for the agricultural conditions of Champaran are absolutely different from those of the other North Bihar districts. Rents are extremely low, and it is impossible to expect that they could remain so as cultivation and population increase and the resources of the district are developed. Without any trouble or discontent, we have enhanced rents, and we have thus relieved the landlords from the odium of doing so and the tenants from the unfairness of apportionment and from the doubt, suspicion, and uncertainty always engendered when a private landlord begins to tamper with his rent-roll. Moreover, these fair rents are fixed for 15 years."

It is true, as the Settlement Officer says, that the average all-round rate of rent paid by occupancy tenants in Champaran is low for Bihar, being Rs. 2-3-5 per acre against Rs. 4-6-1 in Saran, Rs. 4-5-5 in Muzaffarpur; but the land in Champaran is poor and the population sparse in comparison with the latter districts. It appears from the reports that occupancy tenants' lands sold last year on an average in Champaran for only Rs. 17 per acre, as compared with Rs. 81 in Saran and Rs. 50 in Darbhanga. The Board explain the lowness of the prices realised in Champaran on sale of tenant rights by the famine; but famine affected the other districts of Bihar as well as Champaran; on the other hand in both the years for which these returns have been submitted the percentage of transfer has been materially lower in Champaran than in Saran. The Lieutenant-Governor would be glad if the Settlement Officer looked further into these figures. As they stand, they certainly indicate that on area transferred the profits of cultivation are exceedingly low. Any explanations he has to offer the Board will kindly forward with their opinion.

Up to the close of the year, out of a total number of 2,573 fair rent cases decided, only 184 were appealed against. It is to be regretted that as many as 117 of these appeals were pending at the close of the year.

Saran.

10. Mr. M. F. Gauntlett, I.C.S., held direct charge of the operations in Saran till the 10th December, when he was succeeded by Mr. Coupland, I.C.S., who retained charge up to the close of the year.

The area under settlement in Saran is 2,622 square miles, containing 4,296 villages with an estimated number of 600,900 tenants.

The programme for the year was fully carried out.

Thirty-nine appeals were filed against the decisions given, in 30 of which the orders of the Assistant Settlement Officer were upheld and in six modified, the remaining cases being remanded for further enquiry. Some of the disputes that came under decision especially those affecting *diara* lands, were of an important and difficult nature, involving questions of inter-provincial interest. The results of the appeals were satisfactory.

From the commencement of the operations up to 30th September 1898, fair rents had been settled for 57,628, or 9·59 per cent. of the total number of tenants in the district. The total rental in these cases was raised from Rs. 6,45,981 to Rs. 7,16,125, or by 10·85 per cent. These enhancements were large, especially for a district already highly rented; but the Settlement Officer points out that they relate in the main to villages owned by the Hatwa Raj, of which a measurement was made by the Court of Wards in 1874; and that even within recent years there was a considerable portion of waste land available for cultivation on the west side of Saran. The percentage of increase for the district will certainly undergo considerable reduction by the time the operations are closed, but meanwhile there can be no doubt that the Rāj authorities have taken full advantage of their opportunities of enhancing the rent of their tenants.

From figures supplied by the Special Judge it would appear that including 117 appeals filed during the year, the total number of appeals against the orders passed in fair rent cases, up to 30th September 1898, was 361. Of these, 52 were disposed of in previous years and 65 were decided during the year under review. In 32 of these cases the original decisions were upheld, in 24 they were modified, in 20 reversed, while two cases were compromised. The remaining cases were remanded for further enquiry. The effect of these cases seem still to be involved in some obscurity owing to delay in providing the Settlement Officer with copies of the Special Judge's decisions, and it is therefore impossible to draw any deductions as to the character of the Settlement Officer's work. The large number of cases, however, in which his decisions were reversed or modified is *primâ-facie* unsatisfactory.

Darbhanga.

11. Mr. R. B. Hughes, I.C.S., was in direct charge of the operations in the district of Darbhanga, in addition to those in Muzaffarpur, up to the 3rd March 1898, when he was succeeded by Mr. Kerr, I.C.S., who held charge of the work in this district as well as of that in Champaran, for the rest of the year.

Great difficulty was experienced in ascertaining the existing rents in some villages, especially in those in which a partition had taken place. The difficulties which the Settlement Officer overcame with tact and thoroughness are attributed chiefly to the ignorance on the part of the raiyats of their rights under the Tenancy Act, and to their reluctance to disclose abuses.

Recovery of costs.

12. The following table gives statistics as to the recovery of the cost of the operations in North Bihar:—

District.	Approximate total demand.	Demand computed up to the end of the year.	Recoveries.			Unrecovered balance of the computed demand, column (3).	Percentage of recoveries.	Percentage of cost of recovery to amount recovered.		
			In previous years.	Present year.	Total.			In previous years.	Present year.	From beginning to end of the year.
1	2	3	4	5	6	7	8	9	10	11
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.		
Muzaffarpur	7,30,000	5,03,839	73,230	4,10,439	4,83,669	20,170	96	19·6	4·1	6·5
Champaran	7,13,500	5,05,029	1,10,886	2,60,753	3,71,639*	1,25,049†	73	8·6	4·9	6·1
Saran	8,40,000	1,58,246	.....	1,54,870	1,54,870	3,376	98	...	5·64	5·64
Total ...	22,83,500	11,67,114	1,84,116	8,26,062	10,10,178	1,48,595	86	14·3	4·4	...

* To this should be added Rs. 8,588 allowed to landlords in the Bettiah thana as a set-off for sums advanced by them to the Survey Department in 1892-93.

† This figure has been arrived at after adjusting excess collections on account of uncurrent copper. It includes Rs. 90,254 due from the Court of Wards on account of the Bettiah Raj. It appears that at the end of November the amount due was reduced to Rs. 71,554 which the Manager of the Raj proposed to pay in three quarterly instalments by the end of June 1899.

The procedure now adopted is for the camp officer to issue two sets of notices on defaulters before he files requisitions under the Certificate Act. A Certificate Department modelled on the Collectorate one, with which it will be amalgamated when the settlement operations close, has been organised at each district head-quarters, and arrangements have been made for the issue of all certificates against defaulters before the department is transferred to the Collector, so that he may be relieved of the necessity for keeping up any accounts other than those of the Certificate Department.

The very satisfactory collections in every district indicate the readiness with which the assessees paid the amounts due by them and their growing appreciation of the advantages conferred by the settlement.

The realisations from the tenants especially were remarkably good and were effected without friction and mainly without recourse to coercive processes.

Maintenance of records and boundary marks.

13. The maintenance of settlement records and of survey boundary marks was dealt with in paragraphs 2 to 5 of the Government Resolution No. 3475, dated the 21st November 1898, recorded on the Agricultural Report of the Director of the Department of Land Records and Agriculture for the year ending 31st March 1898. The question how the Land Records Maintenance Act, III (B.C.) of 1895, has worked, and what, if any, improvement should be made in the present system for the registration of mutations has been specially reported on by the Director and the Board of Revenue, and will be separately dealt with.

Orissa.

14. Mr. S. L. Maddox, I.C.S., was in charge of settlement operations in Orissa throughout the year, except from the 17th May to the 10th August, when he was on privilege leave, and Mr. J. E. Webster, I.C.S., acted for him.

Before the commencement of the year under report the principles for the settlement of rents and the assessment of revenue had been settled, and the work of the year, as exhibited in the following table, consisted chiefly of the

settlement of fair rents, the assessment of revenue and the general winding up of operations:—

Name of District.	Number of Assistant Settlement Officers employed during the year or for part of the year.	Village boundary disputes decided under the Bengal Tenancy Act.	Area in square miles for which records were attested.	Number of tenants for whom rents were settled.	Number of villages for which draft records were published.	Number of objections under section 105 heard and considered after draft publication.	Number of disputes decided under section 106.	Number of villages for which records were finally published.	Number of villages for which final khatians were copied, checked, and compared.	Number of estates assessed to revenue by Settlement Officer.
1	2	3	4	5	6	7	8	9	10	11
Cuttack. Area under settlement, 2,273 square miles. Tenants, 760,000 ... ... Estates, 4,354	21	Nil.	Nil.	314,262	1,656	14,377	3,666	1,945	1,900	2,331
Balasore. Area under settlement, 1,733 square miles. Tenants, 479,700 ... ... Estates, 1,402	10	37	Nil.	100,278	1,006	7,368	2,796	2,190	1,780	668
Puri. Area under settlement, 1,089 square miles. Tenants, 258,641 ... ... Estates, 488	6	Nil.	Nil.	6,226	106	1,747	314	835	617	328
Total ...	37	37	Nil.	420,766	2,768	23,492	6,776	4,970	4,297	3,327
Khurda Government Estate. Area, 913 square miles ... Tenants, 197,324	3	Nil.	21·76	6,912	54	284	291	674	497	.....
Madhupur Ward's Estate. rea, 63 square miles ... Tenants, 9,670	Included in the number for Cuttack and Balasore.	Nil.	Nil.	9,670	223	153	14	Nil.	150	.....
Grand Total ...	40	37	21·76	437,348	3,045	23,929	7,081	5,584	4,944	3,327

N.B.—This table does not include re-attestation work done in Cuttack, where the records of nearly every village which came on for the settlement of rents had to be re-attested before the work of settlement of rents could proceed.

It was originally anticipated that the settlement of Orissa would be completed by the 31st March 1898, but it would appear that there is still work for another year. Delay was caused by the necessity of re-attesting nearly all the records in the district of Cuttack before the settlement of fair rents could proceed. The operations have been most carefully supervised by the Board of Revenue and the Director of Land Records, the former of whom affirmed in their Land Revenue Report for 1897-98 that the progress made in the settlement of rents was highly satisfactory, and the Lieutenant-Governor himself, during his tour in Orissa in December last, took the opportunity to assure himself that all possible despatch was being brought to bear on the work.

The following table shows the results of the setttlement of rents:—

Name of District.	Estimated total number of tenants.	Tenants for whom rents have been settled from the beginning.	Existing assets dealt with to end of September 1898.	Settled assets down to 30th September 1898.	Increase of column 5 over column 4.	Percentage of increase of column 6 over column 4.
1	2	3	4	5	6	7
			Rs.	Rs.	Rs.	
Cuttack ...	760,000	747,714	17,73,574	20,09,607	2,36,033	13
Balasore ...	479,700	459,319	9,45,913	11,16,710	1,70,797	18
Puri ...	258,641	258,641	5,44,686	6,22,317	77,631	14
Khurda ...	197,324	197,324	3,09,261	3,77,127	67,866	21
Total ...	1,695,665	1,662,998	35,73,434	41,25,761	5,52,327	15

Appeals against the decision of the Assistant Settlement Officers in these cases have been very few. In 1897-98 only 11 appeals were filed, while six were pending from the previous year's file; 15 appeals were decided by the Special Judge, in 13 of which the decision of the lower Court was upheld and in two reversed.

The work of assessment of revenue did not practically begin till the year under report, and the following table shows the progress made in the introduction of the new revenue, and the general results of the assessment :—

1	2	3				4				5
District.	Total number of estates.	Estates in which new revenue was introduced on the 28th April 1898.				Estates in which the new revenue was to be introduced on the 8th November 1898.				Remarks.
		Number of estates.	Existing revenue.	New revenue.*	Enhancement per cent.	Number of estates.	Existing revenue.	New revenue.*	Enhancement per cent.	
			Rs.	Rs.			Rs.	Rs.		
Cuttack	4,354	952	1,87,389	2,87,270	53·3	1,783	2,20,141	3,45,286	56·6	* By new revenue is meant the full revenue to be paid ultimately, when the whole increase is taken.
Balasore	1,402	132	46,649	96,080	106·6	660	1,87,109	3,23,434	72·8	
Puri (without Khurda)	488	87	1,08,256	1,48,021	36·7	241	86,843	1,12,659	29·7	† These figures include 528 estates dealt with in October, after the close of the year under report.
Total ...	6,244	1,171	3,42,294	5,31,371	55·2, being an increase of Rs. 1,89,077.	2,684†	4,94,093	7,81,379	58·2, being an increase of Rs. 2,87,286.	

The variations in the percentages of increase between the earlier and later work are due to local peculiarities which have been explained in detail in Mr. Maddox's report.

The general result for each district and for the province (*i.e.*, the temporarily-settled area, excluding Khurda) works out as follows :—

District.	Total number of estates.	Number of estates dealt with.	Existing revenue of the districts.	Of estates dealt with.		Enhancement of revenue per cent.
				Existing revenue.	Proposed revenue.	
1	2	3	4	5	6	7
			Rs.	Rs.	Rs.	
Cuttack ...	4,354	2,735	7,00,000	4,07,530	6,32,556	55
Balasore ...	1,402	792	4,00,000	2,33,758	4,19,514	79½
Puri (without Khurda) ...	488	328	3,00,000	1,95,099	2,60,680	33⅓
Total ...	6,244	3,855	14,00,000	8,36,387	13,12,750	57, being an increase of Rs. 4,76,363.

The increase of revenue obtained is apparently high, but it is to be remembered that the last settlement lasted for 60 years, that rents or assets increased largely during that period, and that the Government share of the assets now being taken as revenue is far smaller than in the previous settlement. In fact, the settlement with the proprietors is a very lenient one, assessments are being made by the Settlement Officer with the utmost care and consideration, and they have been accepted by the zemindars with readiness. In Balasore, where the enhancement of revenue is greatest, the moderation of the assessment

is shown by the fact that cultivation is rapidly expanding instead of the settlement operations being accompanied, as they sometimes are, by temporary abandonment of cultivation. Some 18 cases of recusancy were reported, but in only five of these have the proprietors continued recusants. One is the case of the Kotdesh estate, where the revenue has been raised from Rs. 81,000 to Rs. 1,04,000. This estate, however, has passed in execution of a decree of the Civil Court, into the hands of the proprietors' creditors who are reported to have expressed their willingness to accept settlement on the terms offered. The other cases in which the proprietors are rescusant are of a less important nature, and involve a revenue of Rs. 1,522 only. The new revenue introduced in April 1898 has been practically paid up in full.

Chittagong.

15. Mr. C. G. H. Allen was in charge of the Chittagong settlement up to 31st March 1898, when he reverted to the regular line, as nothing but office work remained to be done. The Collector of the district, Mr. J. D. Anderson, was in charge of the Settlement Office from 1st April 1898 to the close of the year.

The following table shows the work done under the main heads during the year:—

Head of work.	Total to be done.	Number done.			Number remaining at the end of the year.	Remarks.
		Previous to year under report.	During the year.	Total.		
1	2	3	4	5	6	7
Mahal milan (villages) ...	1,037	1,027	10	1,037	....	
Tenants assessed ...	256,506*	245,452	11,054	256,506	.....	* Revised figures.
Villages finally published	1,037	767	269	1,036	1	

The records of the remaining village have been finally published since the close of the year, but a large amount of copying work and a good deal of *terij* writing remained to be done. The assessment of revenue was completed, and the total increase obtained amounts to Rs. 1,84,153, or nearly 50·5 per cent. on the previous revenue.

Palamau Government estate and Darjeeling Terai.

16. The settlements of the Darjeeling Terai and the Palamau Government estate were practically completed during 1896-97.

Tippera.

17. Mr. J. G. Cumming, I.C.S., continued to be the Settlement Officer of the estates of the Raja of Hill Tippera in the districts of Tippera and Noakhali. The settlement staff was chiefly employed on the settlement of fair rents under section 104. The rents of 15,746 raiyats were settled during the year, an increase of 20·66 per cent. being obtained. Save in very exceptional cases, enhancement was only allowed either on the ground of excess area or of rise in prices; but not on both. Rents were also settled in respect of 384 tenure-holders, the increase obtained being 60·5 per cent. The share of the raiyat's rentals fixed as the rent of tenure-holders, varied between 30 and 50 per cent.; but this sometimes led to an increase of over 100 per cent. in the rent of the latter, and in such cases in order to mitigate the suddenness of the enhancement, progressive enhancements have been allowed. Taking the raiyati and tenure cases together, the total increase to the Raj rent-roll since the beginning of the settlement proceedings has been Rs. 69,664, of which Rs. 50,764 were due to the fair rent cases disposed of during the year under report. The appointment of an additional Special Judge to deal with the accumulation of appeals in the Special Judge's Court has resulted in the disposal of 732 appeals during the year, leaving, however, 242 appeals still to be disposed of. The decision of the lower Court has been upheld in 85 per cent. of the cases, modified in 13·75 per cent., and reversed in only 1·25 per cent.—figures which reflect credit on the settlement staff. The records of 40 cases are said to be still with the High Court.

Patashpur estates in Midnapore.

18. The operations in the Patashpur temporarily-settled estates in Midnapore were completed during the year. The new settlement, which will run for 15 years, has increased the Government revenue by Rs. 8,175 or 23·99 per cent., but the cost of the operations was very high, amounting to Rs. 54,054. The new rents settled for the raiyats are being paid in full.

Jaipur Government estates in Bogra.

19. The settlement of the Jaipur Government estates in Bogra has also been completed. The result of the new settlement, which has been made for 20 years, is an enhancement of Rs. 11,196 or 28 per cent., while the cost of the operations, owing to indifferent management in its earlier stages, was very high, and amounted to Rs. 47,461.

Noakhali Government estates.

20. The 16 Government estates under settlement in the district of Noakhali comprise an area of 109·57 square miles with 10,000 tenants. Fair rents were settled for 5,149 tenants, raising the existing rental by Rs. 16,803 or 36 per cent., the enhancement being due mostly to expansion of cultivation. The enhanced rents have in all cases been accepted by the tenants. Only one appeal was instituted during the year and that was dismissed.

Estates in Backergunge and Faridpur.

21. The settlement of four out of the eight estates under settlement in the districts of Backergunge and Faridpur was concluded during the year, and resulted in an increase of Rs. 21,612 in the revenue.

Services of officers.

22. Mr. Macpherson's services as Director of Land Records were noticed in the Resolution on the Report for 1896-97. The Lieutenant-Governor desires to thank the Board of Revenue for their careful supervision and control over this important Department and to record his acknowledgment of the excellent work done by Mr. Lyon as Director of Land Records and by Captain Crichton as Superintendent of Settlement-Surveys. His Honour's acknowledgments are also due to the Survey Officers mentioned in paragraph 81 of Captain Crichton's Report. As regards the Officers of the Settlement Department, the Lieutenant-Governor fully agrees in the Board's and the Director's high appreciation of the services of Messrs. Maddox, Stevenson-Moore, Allen and Cumming, and cordially endorses the following remarks made by the Director:—

"58. The Officers of the Settlement Department have rendered excellent service during the year, which has on more than one occasion attracted the favourable attention of the Board and of Government. Mr. C. G. H. Allen, I.C.S., has brought the settlement of the Chittagong district to an eminently successful conclusion, in spite of difficulties which Sir Charles Elliott, when Lieutenant-Governor of Bengal, declared to be well nigh insuperable. Mr. J. G. Cumming, I.C.S., is now rapidly winding up his settlement of the estates of the Raja of Tippera in Tippera and Noakhali, and the same thoroughness has characterised his work in the past year as in previous years. Mr. S. L. Maddox, I.C.S., has added still further to the reputation he had already earned as Settlement Officer of Orissa by the conspicuous ability and success with which he has dealt with the work of assessment of revenue in that Province, and Mr. C. J. Stevenson-Moore, I.C.S., has worked indefatigably to improve our procedure in every branch of the settlement proceedings in North Bihar, and has submitted several able and lucid reports on important matters connected with those operations.

"Of the other members of the Civil Service deputed to settlement work during the past year, Messrs. H. deM. Carey, H. Coupland, R. B. Hughes, J. H. Kerr, D. H. Kingsford, H. McPherson and J. E. Webster have done excellent work; and I desire especially to record my thanks to Mr. Webster for the assistance he rendered me during the absence of Mr. Maddox on privilege leave. A serious loss was sustained by the Department in the transfer of Mr. R. B. Hughes to Political employ.

"Babu Jogendra Narain Mitra, Personal Assistant to the Settlement Officer of Orissa, has rendered excellent service throughout the year.

"Among Deputy Collectors, the following officers deserve special mention: Babus Rai Krishna, Bahadur, Prasanna Kumar Banerji, Sri Gopal Bhattacharya, Peary Mohan Basu, Sriram Chandra Bose, Jamini Mohan Das, Giris Chandra Dutt, and Durga Charan Ghose; Maulvi Gholam Ghaus, Babu Bhupendra Nath Gupta, Pundit Rama Balabh Misra, Babu Moti Lal Roy, and Mr. James Taylor. Mr. James Taylor's work in the settlement of Khurda has been especially successful, and Babu Bhupendra Nath Gupta has also done noticeably efficient work in Noakhali.

"Of the Sub-Deputy Collectors employed in the Settlement Department, Babus Abhoy Prosad Das and Hara Krishna Mahanti have continued to render excellent service in Orissa,

while Mr. Sorab S. Day has done good work both in Bogra and Balasore, and has submitted an admirable report on the operations he carried through in the first-named district. Babu Romesh Chandra Dutt has also worked well in Muzaffarpur and Darbhanga."

ORDER.—Ordered, that this Resolution be published in the *Calcutta Gazette*, and that a copy of it, with copies of the reports, be submitted to the Government of India.

By order of the Lieutenant-Governor of Bengal,

M. FINUCANE,

Secretary to the Govt. of Bengal.

No. 1419L.R.

COPY forwarded to the Deputy Surveyor-General in charge, Revenue Branch, Survey of India, for information.

No. 1420L.R.

COPY, with a copy of the Report of the Director of Land Records, forwarded to the Appointment Department of this Government for information, with special reference to paragraph 22 of the Resolution.

No. 1421L.R.

COPY forwarded to the Secretary to the Board of Revenue, Land Revenue Department, for the information of the Board, with reference to his letter No. 124A., dated the 8th February 1899, and for communication to the Director of Land Records, the Superintendent of Settlement-Surveys, all Commissioners of Divisions, District Officers and Settlement Officers.

By order of the Lieutenant-Governor of Bengal,

FRANK LYALL,

Offg. Under-Secy. to the Govt. of Bengal.

CALCUTTA,
The 5th April 1899.

Reg. No. 7127C—1,026—7-4-99.

ANNUAL REPORT

ON THE

SURVEY OPERATIONS IN BENGAL

DURING THE YEAR

1898-99.

From 1st October 1898 to 30th September 1899.

Calcutta:
BENGAL SECRETARIAT PRESS
1900.

Published at the BENGAL SECRETARIAT BOOK DEPÔT,
Writers' Buildings, Calcutta.

OFFICIAL AGENTS.

In India—

THACKER, SPINK & Co., Calcutta.
W. NEWMAN & Co., Calcutta.
THACKER & Co., Bombay.
HIGGINBOTHAM & Co., Madras.
SUPERINTENDENT, AMERICAN BAPTIST MISSION PRESS, Rangoon.

In London—

E. A. ARNOLD, 37 Bedford Street, Strand, W.C.
CONSTABLE & Co., 2 Whitehall Gardens, S.W.
SAMPSON LOW, MARSTON & Co., St. Dunstan's House, Fetter Lane, E.C.
P. S. KING & SON, 9 Bridge Street, Westminster, S.W.
LUZAC & Co., 46 Great Russell Street, W.C.
KEGAN PAUL, TRENCH, TRÜBNER & Co., Charing Cross Road, W.C.
B. QUARITCH, 15 Piccadilly, W.

On the Continent—

FRIEDLÄNDER & SOHN, 11 Carlstrasse, Berlin.
OTTO HARRASSOWITZ, Leipzig.
KARL W. HIERSEMANN, Leipzig.
ERNEST LEROUX, 28 Rue Bonaparte, Paris.
MARTINUS NIJHOFF, The Hague.

INDEX TO CONTENTS.

CHAPTER I.

PAGE

GENERAL REMARKS ON THE PROVINCIAL SURVEYS 1

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND ON RECORDS OF RIGHTS IN PRIVATE ESTATES.

MAJOR SETTLEMENTS.

PATNA DIVISION . .	SARAN	DISTRICT—	TRAVERSE SURVEY	8
	,,	,,	CADASTRAL ,,	10
	,,	,,	TOPOGRAPHICAL ,,	13
	,,	,,	BADAR WORK	*ib.*
	DARBHANGA	,,	TRAVERSE SURVEY	14
	,,	,,	CADASTRAL ,,	15
	,,	,,	BADAR WORK	18
	MUZAFFARPUR (DIARA)	,,	CADASTRAL SURVEY	*ib.*
	MUZAFFARPUR (REVISION OF BAZIDPUR VILLAGE)	,,	,, ,,	19
BHAGALPUR . .	SONTHAL PARGANAS		TRAVERSE ,,	*ib.*

PART II.—REPORTS ON MISCELLANEOUS SURVEYS.

PATNA DIVISION . .	CHAMPARAN	DISTRICT—	TRAVERSE SURVEY	23
	,,	,,	TOPOGRAPHICAL ,,	24
	SARAN	,,	CHAPRA MUNICIPALITY	25
	,,	,,	REVILGANJ ,,	*ib.*
	,,	,,	BALLIA-SARAN DISPUTE	*ib.*
	DARBHANGA	,,	DARBHANGA MUNICIPALITY	26
	,, (REVISION OF KHANAPURI OF BABU GANESHWAR PERSHAD SINGH'S AREA)		CADASTRAL SURVEY	*ib.*
	PATNA	,,	DIARA CADASTRAL SURVEY	*ib.*
	,,	,,	TOPOGRAPHICAL ,,	27
	SHAHABAD	,,	KUCHUAR MAHAL ,,	*ib.*
	,,	,,	DUMRAON RAJ CADASTRAL SURVEY.	28
	,,	,,	DIARA TOPOGRAPHICAL SURVEY	*ib.*
	,,	,,	DUMRAON RAJ BALLIA DISPUTE	*ib.*
BHAGALPUR DIVISION	BHAGALPUR AND PURNEA DISTRICTS.		NEPAL FRONTIER . . .	29

CHAPTER III.

PAGE

PART I.—PROGRAMME FOR THE BENGAL SURVEYS DURING 1899-1900 . . 31

„ *II.*—TOURS OF THE SUPERINTENDENT OF SETTLEMENT-SURVEYS . . 32

„ *III.*—SERVICES OF OFFICERS . . . . . *ib.*

„ *IV.*—CO-OPERATION OF LANDLORDS, &c. . . . . *ib.*

„ *IV.*—DITTO OF REVENUE OFFICERS . . . . . *ib.*

LIST OF APPENDICES.

APPENDIX I.—SUMMARY OF OUTTURN 33

„ *II.*—STATEMENT OF EXPENDITURE 34

„ *III.*— DITTO OF COST RATES PER SQUARE MILE 42

„ *IV.*— DITTO OF INSPECTIONS BY OFFICERS . . . . . *ib.*

„ *V.*—REPORT ON THE BENGAL DRAWING OFFICE 43

LIST OF INDEX MAPS.

PROVINCE OF BENGAL . . . . . *To face page* 1

SARAN DISTRICT . . . . . „ „ 8

DARBHANGA DISTRICT . . . . . „ „ 14

MUZAFFARPUR DISTRICT . . . . . „ „ 18

SONTHAL PARGANAS DISTRICT . . . . . „ „ 19

CHAMPARAN DISTRICT . . . . . „ „ 23

133047

ANNUAL REPORT

OF

THE SUPERINTENDENT OF SETTLEMENT-SURVEYS, BENGAL,

ON THE

SURVEY AND RECORD OF RIGHTS OPERATIONS IN BENGAL

DURING THE YEAR 1898-99.

No. $\frac{3053}{R.-7—59}$.

FROM CAPTAIN C. W. H. SYMONDS, I.S.C.,

Offg. Superintendent of Settlement-Surveys in Bengal,

TO THE SECRETARY TO THE BOARD OF REVENUE, LOWER PROVINCES,

Dated Digha, the 30th November 1899.

SIR,

I HAVE the honour to herewith submit my report on the Provincial Survey Operations which have been carried out in Bengal during the past survey year, namely, from the 1st October 1898 to the 30th September 1899.

The administrative charge of the operations was held by Captain R. T. Crichton, I.S.C., from the 1st October 1898 until the 26th of April 1899, on which date he handed over charge to me and availed himself of furlough.

CHAPTER I.

GENERAL REMARKS.

Programme for the year.

2. The programme for the year as sanctioned by the Bengal Government embraced the operations shown in the subjoined tabular statement:—

DISTRICT.		Traverse.	Cadastral.	Topographical.
		Sq. m.	Sq. m.	Sq. m.
Saran	... ...	143	535	(*a*)87
Darbhanga	... ...	521	680	...
Backergunge	... ...	150	...	...
Champaran	... ...	125	...	(*b*)90
Burdwan	... ...	88	...	88
Sonthal Parganas P. E.	... ...	620	...	...
Darbhanga city	... ...	7	...	(*c*)7
Chapra „	... ...	7	...	(*c*)7
Shahabad diara	.. ...	15	...	(*d*)15
Kachuar mahals Nepal boundary	Relaying boundaries (*e*).			
	Total ...	1,676	1,215	294

(*a*) Topographical survey of the Saran diara on the 64-inch scale.
(*b*) Ditto ditto north-west of Champaran, 2-inch scale.
(*c*) Survey with record of occupancy of Chapra and Darbhanga Municipalities on the 64-inch scale.
(*d*) Topographical survey on the 4-inch scale.
(*e*) Relaying old boundary marks.

133047

3. The subjoined tabular statement shows under each description of survey the area which has been completed:—

Division.	District and estate.	Traverse survey.	Cadastral survey.	Record-writing.	Topographical survey on the 16-inch scale.	Topographical survey on the 2-inch scale.	City survey on 64-inch scale.
1	2	3	4	5	6	7	8
Private Estates.							
Major Settlements.							
Patna ...	Saran	264·56	548·09	548·09	(*a*)56·83	...	...
	Darbhanga ...	618·72	683·82	683·82	...	...	...
	Muzaffarpur diara ...	...	(*j*)2·65	(*j*)2·65	...	...	...
	Ditto (revision of Bazidpur village).	...	(*p*)2·63	(*p*)2·63	...	...	...
Bhagalpur ...	Sonthal Parganas (private estates).	726	...	...	...	...	...
Miscellaneous.							
Patna ...	Champaran ...	(*b*)95	...	...	...	(*b*)95	...
	Darbhanga (city) ...	(*c*)6·96	...	...	...	...	(*d*)4
	Chapra (do.) ...	(*e*)1·84	...	...	...	...	(*f*) 1·9
	Revelganj (do.) ...	...	...	...	2·00	...	...
	Shahabad Dumraon Raj	...	(*g*)25·86	(*g*)25·86	...	...	...
	Shahabad diara ...	...	...	...	(*h*)25·08	...	...
	Kachuar Mahal, Nepal Frontier.	...	...	...	(*i*)...	...	...
	Ballia Saran dispute ...	...	...	...	(*k*)13·08	...	...
	Patna diara ...	...	(*l*)29·33	(*l*)29·33	(*m*)10·61	...	...
	Shahabad Dumraon Raj diara.	(*n*)14·21	...	...	(*n*)14·21	...	...
	Babu Ganeshwar Pershad Singh's area revision.	...	...	(*o*)22·2	...	...	...
	Total ...	1,72·729	1,292·38	1,314·58	121·81	95	5·9

(*a*) Topographical survey of all villages lying in the Gogra, Ganges, and Gandak diara on a scale of 16-inch=1 mile.
(*b*) Traverse and topographical survey on the 2-inch=1 mile scale of 95 square miles in the north-west corner of the Champaran district (see detailed report).
(*c*) Traverse survey of the urban and raiyati area of the Darbhanga Municipality.
(*d*) Cadastral survey with record of occupancy of the Darbhanga Municipality.
(*e*) Traverse survey of the urban and raiyati area of the Chapra Municipality.
(*f*) Cadastral survey with a record of occupancy of the urban area of the Chapra Municipality.
(*g*) Detailed survey of two villages belonging to the Dumraon Raj and six other villages all lying in the diara of the Gogra river adjoining Saran district (*vide* detailed report on Saran).
(*h*) Traverse and topographical survey of all permanently-settled estates of Shahabad district lying in the *diara* of the Gogra and Ganges rivers.
(*i*) Relaying boundaries. Relaying stations on the Kachuar mahal and Nepal boundary.
(*j*) Detail survey with records of three portions of villages lying in the Muzaffarpur district and adjoining Saran.
(*k*) Topographical survey of five villages of Ballia district (see detailed report on Saran).
(*l*) Cadastral survey with records of ten villages lying in the Patna diara (*vide* detailed report on Saran).
(*m*) Topographical survey of eleven villages in the Patna diara (*vide* detailed report on Saran).
(*n*) Traverse and topographical survey on 16-inch=1 mile scale of five estates effected by the Dumraon Raj and Ballia disputes (see detailed report on Saran).
(*o*) Revision of *khanapuri* of Babu Ganeshwar Pershad estate in Darbhanga.
(*p*) Revision of survey and *khanapuri* of Bazidpur, Muzaffarpur.

From the foregoing tabular statement, it will be seen that the programme, with the exception of Burdwan and Backergunge, has been fully worked up to.

4. The following statement will show the programme as sanctioned by Government and the actual area completed during the season:—

	Traverse.	Cadastral.	Topographical.
Programme as sanctioned by Government ...	1,676·00	1,215·00	2,94·00
Area completed during season 1898-99 ...	1,727·29	1,289·75	220·71
Difference ...	+51·29	+74·75	— 73·29

The topographical survey falls short of the sanctioned programme by 73·29 square miles.

5. During the past season there were—

Angular observations with the theodolite ...	52,392
Linear miles of traversing	6,973·12
Astronomical observations for Azimuth ...	279
Connnections to stations of the Great Trigonometrical Survey	7
Permanent marks embedded at village trijunctions ...	3,585
Temporary marks embedded (Cylinders) ...	17,197
„ „ (Pegs) ...	17,578
Iron pins and bricks (*a*)	2,389
Villages embraced in the survey operations (*b*) ...	2,147
Fields in these villages (*c*)	2,358,511
Linear miles of test survey	6,926
Entries checked in the records by survey officers and Inspectors	611,228

(*a*) These iron pins were used in the survey of the Darbhanga Municipality.
(*b*) This includes 95 villages and three portions topographically surveyed on the 16-inch scale in the Saran Diara and also the revision of the *khanapuri* of Babu Ganeshwar Pershad's area comprising 24 villages containing 23,462 fields.
(*c*) This does not include Babu Ganeshwar Pershad's area.

6. The following statement shows according to the different scales, the number of sheets on which the survey has been mapped:—

	No. of sheets.
Cadastrally survey on 16-inches = 1 mile	2,677
Topographically surveyed on 16-inches = 1 mile ...	204
Municipal surveyed on 64-inches = 1 mile	134
Topographically surveyed on 2-inches = 1 mile. Number of plane table section	17

7. From the subjoined tabular statement will be found the expenditure incurred in each district during the past survey year, including the usual share of cost of control and 4 per cent. charge for instruments :—

Division.	District.	Traverse survey.	Cadastral Survey.		Topographical survey.	Total.
			Detail survey.	Record-writing.		
1	2	3	4	5	6	7
	Temporarily-settled and Government Estates.	Rs.	Rs.	Rs.	Rs.	Rs.
	Private Estates.					
	Major Settlements.					
Patna ...	Saran	9,574	39,400	(*a*)34,027	719	83,720
	Darbhanga	(*b*)21,436	(*c*)45,077	(*d*)60,341	...	1,26,854
	Ditto (revision) ...	...	147	1,684	...	(*e*)1,831
	Muzaffarpur	...	60	60	...	(*f*)120
	Ditto (Bazidpur village)	14	...	248	...	(*h*)262
Bhagalpur ...	Sonthal Parganas ...	32,693	...	...	...	32,693
	Wards' Estates.					
Patna ...	Gaya (Tikari ward's estate)...	300	...	...	...	(*g*)300

(*a*) Includes Rs. 1,687 cost of Badar Establishment employed in the camp in the field.
(*b*) Ditto „ 423, arrears, traversing.
(*c*) Ditto „ 985, arrears, area extraction, traces, &c.
(*d*) Ditto „ 1,077, arrears Rs. 1,811, cost of Badar establishment in the field, and Rs. 10 on account of fair copying of records damaged in transit.
(*e*) This expenditure is on the revision of the *khanapuri* of Babu Ganeshwar Pershad Singh's villages, to be met by the zamindar.
(*f*) This expenditure is on account survey of portions of three villages.
(*g*) Ditto on completion of traverse records received from late Nos. 4 and 5 Parties (Bihar).
(*h*) Expenditure met by zamindar.

Division.	District.	Traverse survey.	Cadastral Survey.		Topographical survey.	Total.
			Detail survey.	Record writing.		
1	2	3	4	5	6	7
	Temporarily-settled and Government Estates.	Rs.	Rs	Rs.	Rs.	Rs.
	Miscellaneous.					
	Champaran (topographical) ...	...	...	...	9,545	9,545
	Darbhanga (City) ...	1,757	4,168	...	...	5,925
	Ditto (Samastipur) ..	...	2	...	...	2
	Muzaffarpur (Gobindpur Tera Rasia).	...	...	44	...	(a)44
	Saran (Chapra City) ...	1,245	3,233	...	...	4,478
	Do. (Shitab Diara and Dhusaria).	185	546	146	...	(b)877
	Ballia (Diara Topo) ...	...	...	...	150	150
	Patna (Railway Ghat survey)	158	...	...	...	(c)158
	Do. (Diara villages) ...	...	1,270	377	...	(d)1,647
	Do. (Diara Topo) ...	...	...	...	120	(d)120
	Shahabad Dumraon Raj Ballia—Dispute ...	102	359	...	...	(b)461
	Ditto (Diara villages) ...	...	216	144	...	(b)360
	Ditto (Diara Topo) ...	...	...	...	238	(e)238
	Ditto (Kachuar Mahal)	789	...	...	...	(e)789
Bhagalpur ...	Nepal Frontier (re-demarcation).	716	...	...	...	(f)716
	Monghyr (Binda diara) ...	48	...	...	...	(a)48
Bengal Drawing Office.	Bihar (badars)	...	...	2,628	...	2,628
	Orissa (badars)	...	...	1,034	...	1,034
	Chakla Roshnabad (badars)...	...	...	575	...	575
	Orissa Khurda, &c. (badars)...	...	...	6,506	...	6,506
	Total ...	69,017	94,478	1,07,814	10,772	2,82,081

(a) Expenditure met by zemindar.
(b) Ditto ditto Dumraon Raj.
(c) Ditto ditto East Indian Railway Company.
(d) Expenditure met by Collector of Patna.
(e) Debitable to Bihar grant.
(f) Ditto to Bengal Government under head of "Political."

General principle.

8. During the past season there has been no change in the general procedure which has been in vogue for the past seven seasons.

Attendance of raiyats.

9. At the suggestion of Mr. T. W. Babonau a new form was introduced for one month (as a test) during the past field season, with a view to secure the better attendance of raiyats and zemindars. This form was supplied to the amins who entered in the proper columns the number of the fields and the names of those whose attendance was required for either survey or *khanapuri*. Each of the interested parties signed against those fields in which they had vested interests. Both the raiyats and zamindars appreciated this change in the old procedure, and its value is proved by the fact that in the Saran camp alone the reports for non-attendance were reduced to one-ninth. This procedure will be adopted in all Bengal surveys in future.

10. The procedure laid down in paragraphs 10, 11, 12, 13, 14, 17, 18, 20, 23, 24, 26 of Captain R. T. Crichton's Annual Report for 1897-98 were strictly adhered to during the past season.

Temporary demarcation of boundaries.

11. There have been no serious complaints against the temporary demarcation of village boundaries. As usual the demarcation of villages lying in the Saran diara was defective. This is due to the fact that the raiyats were unable to point out their boundaries in waste-land tracts.

Permanent marking of villages.

12. All village trijunctions were marked by triangular stone prisms obtained from the Bengal Stone Company. The intermediate theodolite stations, situated on high land and not subject to river action, were marked by means of 2-inch baked clay cylinders which were purchased locally. In diara tracts-bamboos pegs only were used.

Unit of cadastral survey.

13. The unit of cadastral survey was that defined in paragraph 19 of the Annual Report for 1897-98.

Scale of survey.

14. In Bihar, all villages were cadastrally surveyed on a scale of 16-inch= 1 mile, with the exception of those villages situated in the Saran diara. These were surveyed topographically on the 16-inch scale. All village sites in Bihar have been surveyed on a scale of 64-inches=1 mile. This has necessitated the use of 1,241 additional sheets. In the Champaran district, the 2-inch=1 mile scale was adopted for the topographical survey.

Cheraut system of survey.

15. It was only found necessary to adopt this method of survey and *khanapuri* in the Darbhanga district; where eleven villages, comprising 86,111 fields, were successfully dealt with.

Supply of records to the Settlement Department.

16. In order to enable the Settlement Department to make early arrangements for attestations, all the records as completed were despatched in batches to the Settlement Officer. All the records, traces, &c., of both Saran and Darbhanga have been sent to the Settlement Officer, with the exception of a few of the latter; these will be sent early in October.

Bengal Badar Establishment.

17. The arrangements made by Captain R. T. Crichton in 1897-98 for the purpose of expediting the completion of the attestation badars, as will be seen from the following facts, worked most excellently. In the Saran camp, the following area was dealt with: 877 villages containing 1,180,871 fields, and comprising an area of 555·27 square miles. In this area the Settlement Department submitted badars for only 582 villages, in which changes occurred in only 3,309 fields which gives a percentage of only ·28 on the entire season's work. In the Darbhanga district, the percentage worked out slightly higher, namely, ·40. The area dealt with in the latter district was 965 villages containing 110,808 fields, and comprising an area of 732·54 square miles. The above figures speak for themselves as regards the accuracy of the work, and reflects great credit on the supervising staff of both camps. All the badars for both Saran and Darbhanga have been completed, and the maps and area volumes despatched to the Bengal Drawing office.

Suppression of raiyats.

18. In the Darbhanga district, with the exception of those villages belonging to the Darbhanga Raj, the suppression of raiyats was exceedingly prevalent. In one case, in Bhitaoli, it was found that four large blocks of paddy had been mapped as one large field. As the fields within these blocks were all separated by clearly defined *ails*, it was evident that they were not all maliks *zirait*.

In order to put a stop to the suppression of the raiyats by the maliks the Settlement Officer issued orders that all inspectors, where the maliks claim as their *khudkhasht* blocks of paddy and where they suspect them to be cultivated by the raiyats, should have all the fields within the blocks surrounded by main *ails* or boundaries, separately mapped. This order, together with a fine of Rs. 500 imposed on Rai Ganga Pershad, had the desired effect and little or no trouble was subsequently experienced.

Disputed entries.

19. During the season under report three kanungos were appointed to the Saran Camp and four to the Darbhanga Camp to enquire into and settle interior disputes.

In the former district, there were 40,795 interior disputes; of these 34,170 were settled by kanungos.

In the Darbanga district, there were 43,617 disputes, effecting 67,873 fields; of these, all have been settled by the same agency, with the exception of disputes affecting 4,000 fields. In the Saran district, considerable friction existed between the survey establishment and the kanungos, especially in the case of Babu Bansgopal Lal. On the latter's being censured by the Settlement Officer, however, matters worked more smoothly, and I venture to think that under the new rules regarding the powers of kanungos over and their relations with the survey establishment recently drawn up by Mr. Kerr, there will be no further trouble under this head. The idea is an excellent one, and every effort should be made to make matters work smoothly.

Training of Junior Civilians.

20. During the past season, Messrs Johnston, Woodman, Hignell, Strong, and Cormes, were put through a course of surveying in the Saran district, and Messrs. Crump, Thomas, Salkeld, Cammiade, Mellor, and Gourlay in the Darbhanga district. The method of training the above-mentioned officers was in accordance with the rules drawn up by Captain R. T. Crichton and Mr. Stevenson-Moore.

Copies of maps and records.

21. In the Saran district, the sum deposited for copies of records by zamindars and others amounted to Rs. 956-7-9. Of this sum, Rs. 644-7-1 was paid to copyists, and the balance Rs. 312-0-8 credited to Government.

In the Darbhanga district, Rs. 2,404-10-5 were deposited by zamindars. Of this sum, Rs. 1,574-4-7 were paid to copyists, and Rs. 830-5-10 credited to Government.

Chainmen and menial labour.

22. During the past field season no free labour was supplied in North Bihar. Each cooly was paid at the rate of one-and-a-half anna per diem with the exception of those coolies who were employed in the survey of the Darbhanga Municipality. As the difficulty experienced in obtaining coolies for this survey at a rate of one-and-a-half annas per diem, so delayed the completion of the work, Mr. C. S. Kraal was authorised to engage them at two annas per diem.

Powers of officers under the Survey Act.

23. Messrs. A. W. Smart, C. S. Kraal, and H. Dowman were gazetted as Assistant Superintendents of Survey under the Survey Act [Act V (B.C.) of 1875] in their respective districts.

Under the same Act, Mr. E. F. Berkeley was gazetted as an Assistant Superintendent of Survey in the Sonthal Parganas. In addition to this, he was gazetted as an Assistant Settlement Officer under the Sonthal Parganas Settlement Regulation, III of 1872.

24. The following tabular statement shows the sums realised under the head of fines and process-fees:—

District.	Amount by fines.	Amount by process-fees.
	Rs.	Rs. A.
Saran	150	242 4
Darbhanga	126	749 4
Sonthal Parganas	.....	.....
Total ...	276	991 8

The above figures compare very favourably with the figures given in the annual report for 1897-98 which were, respectively, Rs. 2,036-12 for fines and Rs. 3,197-4 for process-fees.

Attitude of the inhabitants.

25. Throughout both Saran and Darbhanga both the zamindars and the raiyats took a keen interest in the work, especially at the *khanapuri* stage, and showed the greatest eagerness to obtain their *parcha* slips.

In the Sonthal Parganas, considerable obstruction was experienced in tappa Manihari, where the character of the inhabitants is known to be notoriously bad. The obstruction invariably took the form of uprooting theodolite stations. Cases were instituted and the offending parties convicted and punished. The uprooting of theodolite stations seriously delayed the work, because not only had the sub-surveyors to relay them, but they had also to appear as witnesses for the prosecution.

Boundary disputes.

26. In the Saran district, the number of boundary disputes amounted to 341 and in the Darbhanga district to 682. All these have been settled by the Assistant Settlement Officers.

Nature of tenures.

27. In both the districts of Saran and Darbhanga, the tenures have been for the most part intricate *pattidari*. The subjoined statement will show the different kinds of tenures dealt with :—

	Pattidari.	Ijmali.	Wahid zamindari.
No. of villages in Saran ...	973	...	93
Ditto in Darbhanga ...	598	131	187
Total ...	1,571	131	280

Recess quarters.

28. The head-quarters of the Bihar survey, together with the Bihar traverse section, recessed at Mussoorie.

The Saran and Darbhanga cadastral sections recessed at Digha together with the Champaran topographical detachment.

The Sonthal Parganas traverse detachment recessed at Naya Dumka.

Agreement with amins.

29. As in previous seasons, stamped agreements were taken from all amins, but notwithstanding this precaution, 30 amins absconded from the Saran camp and (18) from the Darbhanga section. All these men forfeited all sums due to them for work done on contract, and were also debarred from further employment.

Class of amins employed.

30. From the subjoined statement will be seen the number of amins employed under the heads of "Local" and "Foreign" in the Saran and Darbhanga section :—

District.	Local.	Foreign.
Saran	103	203
Darbhanga	197	143
Total ...	300	346

In the Saran camp, the average daily outturn in both survey and *khanapuri* is as follows :—

Survey.

	Acres.
Local amins, per diem	20
Foreign amins, ditto	23

Khanapuri.

	Nos.
Local amins, per diem	58
Foreign amins, ditto	55

In the Darbhanga camp—

Survey.

	Acres.
Local amins, per diem	18
Foreign amins, ditto	20

Khanapuri.

		Nos.
Local amins,	per diem	59
Foreign amins,	ditto	54

Office of the Superintendent.

31. The scheme for the amalgamation of the two offices of the Superintendent, Settlement-Surveys, Bengal, under the head of controlling office sanctioned by the Government last season, has worked excellently. During the field season, the controlling office was located at Digha, while Captain R. T. Crichton was accompanied on tour by one tour clerk. The entire establishment has worked very satisfactorily during both the field and recess season, and I have great pleasure in bringing to special notice, the excellent services rendered by Ramji Lal, head-clerk, and Raghubir Saran, head-accountant.

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND ON RECORDS OF RIGHTS IN PRIVATE ESTATES.

MAJOR SETTLEMENTS.

SARAN DISTRICT.

Traverse Survey.

32. The area which remained for traverse in the Saran district consisted of the completion of the following thanas:—

Manjhi. | Chapra.
Mushruk. | Sonepur.
Parsa.

The traverse section which was under the supervision of Mr. H. Dowman during the entire field and recess season took the field on the 1st of November 1898.

The strength of the section was as follows:—

Mr. H. Dowman in charge.
Lieutenant A. Mears (attached).
22 Sub-surveyors.
17 Computers, draftsmen, &c.
320 Menials, including guardmen, chainmen, line-cutters, and khalasis.

Area traversed during the season.

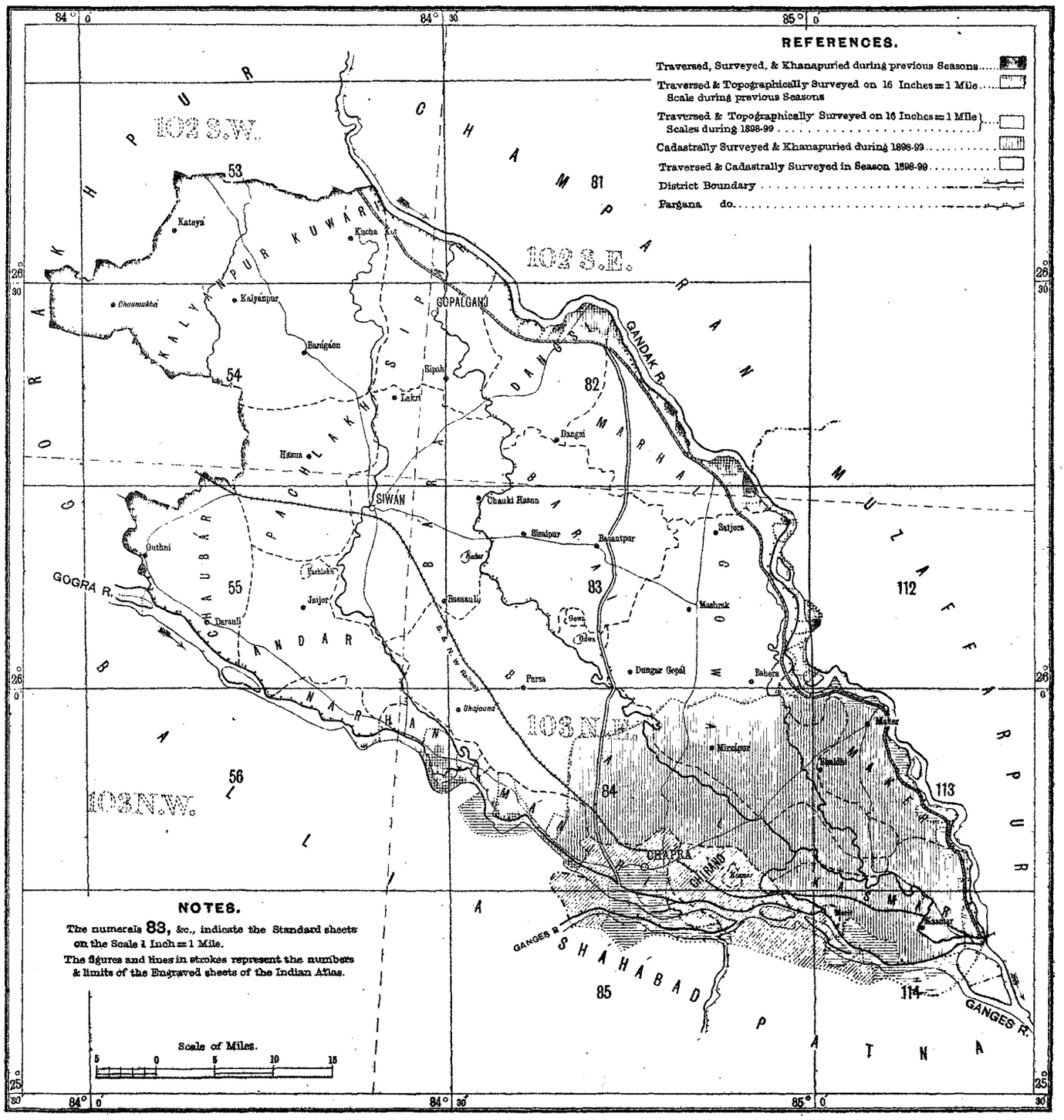
The entire area was completed by the end of December, and only six squads remained, who were chiefly employed on revisions, etc. The area traversed is shown in the subjoined tabular statement:—

THANA.	Pargana.	Number of villages and blocks.	Area in square miles.	REMARKS.
1	2	3	4	5
Manjhi ...	Various.	7	10·91	Diara lands.
Mushruk ...		3	3·76	
Chapra ...		137	124·87	
Sonepur ...		80	88·66	
Parsa ...		66	36·36	
Chapra (Municipality) ...		40	1·84	Urban area of the Chapra Municipality.
Total Villages ...	...	293	264·56	
Total Blocks ...	...	40	1·84	

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT SARAN

1898-99. No. 4 PARTY.



Reg. No 513, S. I. D.—Jan. 00.—1,150. Photo. S. I. O., Calcutta.

No. 406-S. 1900.

The origin of survey was the same as that used in previous seasons, namely, the intersection of North Latitude 26°15′00″ and East Longitude 84°30′00″.

The entire area, with the exception of the Chapra Municipality, consisted of diara lands lying in the Gogra, Ganges, and Gandak rivers. The latter area was divided into six river circuits. These were again divided into 21 sub-circuits.

The number of villages contained in the 21 sub-circuits amounted to 293, giving an average of 12·60 square miles in each sub-circuit.

In each of the above-mentioned villages, 311 sub-traverses were run.

The urban area of the Chapra Municipality was contained in one sub-circuit which was again subdivided into 40 blocks. In these 40 blocks 331 sub-traverses were run.

During the season 914·77 linear miles of chaining were run in the diara tracts and 57·86 in the urban area of the Chapra Municipality. In the former area 121·05 linear miles were run on river circuits, 60·59 on sub-circuits, 413·87 on village circuits, and 319·26 on sub-traverses.

In the urban area of the Chapra Municipality 6·25 linear miles were run on sub-circuits, 16·32 on the blocks into which the sub-circuits were sub-divided, and 35·29 on sub-traverses.

In order to ensure accuracy in chaining two chains of unequal lengths were used on both main and sub-circuits, one of 100 links and another of 93 links. Both measurements were compared by the sub-surveyor in the field and entered in ink in the field book.

Each of the sub-surveyors was supplied with two spare chains which had been carefully tested against a standard laid down in camp by means of standard steel bars. These spare chains were submitted alternately each week to be tested.

The corrections applied to each 100 links was as follows :—

	Links.		Links.
When the northing was	+ 4·85	When the easting was	+ 4 50
Ditto southing „	+ 4·96	Ditto westing „	+ 4 75

In order to test the accuracy of the angular work, 38 Azimuth observations were made to east and west stars at an average distance of 25 angles.

The average angular corrections applied were +1′ in 18 angles, and −1′ in 25 angles on the new work and +1′ in 21 angles, and −1′ in 16 angles, on the old and new work combined, that is to say, on the entire polygons.

The results of the 38 observations for Azimuth gives a mean variation of the magnetic needle of 1° 43′ 26″ East of the true meridian. As no stations of the Great Trigonometrical Survey fell within the area under survey, no connections were made.

During the season 5,815 new stations were embedded. Of these, 3,643 were in diara lands and 2,172 in the urban area of the Chapra Municipality. In the diara lands, 185 stones, 1,147 cylinders, and 61 bricks were embedded, and and 2,250 stations were marked by pegs.

In the Chapra City survey, 19 stations were marked by cylinders and 2,153 by bricks.

The theodolite was set up 7,745 times. This includes both "Shuru" and "Milan" angles.

The sub-surveyors and line-cutters were provided with traces from the old 4-inches revenue survey maps.

The demarcation was found to be satisfactorily carried out by the villagers in compliance with notices which had been previously served on them through the Collector of the district.

The health of the establishment throughout the field season was exceptionally good. Two deaths from cholera occurred during the annual fair at Sonepur.

The camp officer reports that owing to the willing assistance rendered by both zamindars and raiyats it was not found necessary to inflict any fines, or to issue any process-fee notices.

All the computations were completed by the end of January and plots issued to the cadastral section.

There are no arrears, which is very satisfactory, and reflects credit on Mr. Dowman and his computing establishment.

Of the native establishment, both sub-surveyors and computers, the following are deserving of particular mention :—

Lal Mohana Gangopadhya, camp writer and head computor, also Jogendra Chandra Ghosal, Monohar Daji, Pashupatti Chatterji, and Gopal. Sita Ram of the computing establishment. Amongst the sub-surveyors, Kundan Lal, Murli, Monohar, Peari Lal, Mohiuddin, Canpat Rai, and Mayadhari, have done excellent work.

The Persian writer Mathura Pershad is also deserving of mention.

The total expenditure incurred on the Saran traverse amounted to Rs. 9,574, which gives an incidence of Rs. 36 per square mile.

Cadastral Survey with Records.

33. The Saran cadastral section, consisting of the following establishment, was under the charge of Mr. A. W. Smart throughout the season, and consisted of the following establishment:—

Mr. E. F. Berkeley (up to the 12th November 1898).
Mr. C. S. Gasper (from 1st July 1899).
Mr. H. H. B. Hanby (from 7th November 1898).
Mr. P. L. Causley and Mr. H. H. Taylor (up to 21st March 1899).

The following composed the native establishment:—Three head-inspectors, with 30 inspectors, 205 foreign amins, 103 local, 308 muharrirs, and 490 mudhas together with the usual office establishment. During recess the establishment was reduced to the following: 278 amins and 255 mohurirs. Field operations commenced on the 5th of November and closed on the 20th of April, on which date the establishment returned to recess quarters at Digha. Three villages, owing to their being under water, were not completed before the section left the field for recess The survey and *khanapuri* of these villages was finally completed on the 16th of June.

The area surveyed was the remaining portion of the Saran district lying in the south-east corner in the fork of the Ganges and the Gandak rivers.

The following table will show the area completed during the season under report:—

District.	Thana.	Pargana.	Survey and Khanapuri.		
			Villages.	Fields.	Square miles.
1	2	3	4	5	6
Saran	Chapra	Ball	276	335,854	151·51
		Gowa	16	24,575	8·85
		Kasmar	4	3,038	1·95
		Chirand	67	50,950	40·05
		Manjhi	29	23,921	13·64
	Parsa	Ball	12	8,393	4·19
		Gowa	277	333,621	137·35
		Maker	239	221,349	111·53
	Sonpur	Kasmar	143	147,705	75·78
		Chirand	1	297	0·18
		Gowa	2	7,748	3·06
	Total	...	1,066	1,157,451	548·09

The area has been mapped on 1,274 sheets on a scale of 16-inch = one mile. All village sites have been surveyed on a scale of 64-inch = one mile, and comprise 551 sheets.

The average size of the field is ·3 of an acre. In order to test the accuracy of the survey 1,871 linear miles of *partals* have been run by European officers and independently. The amount of *partals* run by inspectors was 1,645 linear miles, giving a total of 3,516 linear miles which gives an average of 6·41 linear miles per square mile. In the survey of village

sites on the 64-inch scale, portions of 330 were re-surveyed as an independent check and as a further check 1,522 chains of *partal* were run through the main streets and alleys. The results of these checks proved the work to be excellent.

Of the total number of fields, namely, 1,157,451, 9,689 entries were checked by European officers and 301,352 by inspectors, which brings the average number of entries checked to 26·9 per cent. This check is exclusive of that done by Assistant Settlement Officers and kanungos.

The scale adopted for cadastral survey was 16-inch = one mile and that of village sites 64-inch = one mile.

The area surveyed was divided into three circles, and these were again subdivided into ten inspectors circles, with one head inspector and one European assistant in each circle, who supervised and checked the work. During the season, 203 foreign and 103 local amins were employed, and the daily average outturn is as follows:—

Survey.

	Acres.
Foreign amins, per diem	23
Local amins, ditto	20

Khanapuri.

	Nos.
Foreign amins, per diem	55
Local amins, ditto	58

In the area surveyed there were 341 boundary disputes. These have all been settled by the Assistant Settlement Officer.

During the season there were 40,795 internal disputes, of which 34,170 were settled by the kanungos, leaving 6,625 to be settled at time of attestation. The khewats of both landlords and tenure-holders were prepared by the inspectors. These were checked by the head-inspectors and *khanapuri* officers.

The tenure throughout the season has been of a very intricate nature. Out of a total of 1,066 villages, 973 were *pattidari* and 93 *wahid*. Mr. A. W. Smart reports that the greatest number of tauzis in one village was 56, and the greatest number of *pattis* in one tauzi was 250, which in itself speaks for the intricacy of work.

During the season the new *parcha* with area slip attached, which was introduced at the end of last season, was used.

The chief difficulty experienced was the non-residence of zamindars and birtdars. It was owing to this that as the khewats could not be written up in time the record-writing was delayed.

Another circumstance which tended to delay the work arose from the issue of an order by the Settlement Officer that where two or more estates were held in common, *khanapuri* was not to proceed until an enquiry had been held by the Assistant Settlement Officer. As a large number of villages, the *khanapuri* of which was in abeyance for over a month, were effected by this order, the Assistant Settlement Officer, owing to press of work, found it impossible to comply with the wishes of the Settlement Officer, and the order was subsequently cancelled.

The presence of water in a large number of villages also delayed the work. These villages could not be completed until the middle of June.

As a rule the zamindars and raiyats took a great interest in the operations both at the survey and *khanapuri* stage and showed themselves very eager to obtain their *parcha* slips.

The preliminary notices for non-attendance were very largely used, their number being 5,310. These usually had the desired effect, and it was found necessary to only impose fines aggregating Rs. 150. The number of process-fee notices issued represented a sum of Rs. 242-4 which was realised by affixing court-fee stamps to each notice.

During the season a new procedure was adopted (in both the cadastral camps for over a month). The amin was supplied with a printed notice form having columns for the names of the parties whose attendance was necessary for the portion of the village under survey or *khanapuri* during the day. The parties required signed these notices, the results being that reports for non-attendance were reduced to one-ninth.

The following factories and outworks fell within the area under survey:—

Factories.—Arwa, Sitalpur, Chetan, Parsa, Hariharpur, and Nawada.
Outworks.—Pargambarpur, Arra, Tepti, Muna, and Morhawra of Ramkola.

In comparison with previous seasons, the demand for copies of maps and records has been very small. Rupees 956-7-9 was deposited by zamindars and others. Of this sum, Rs. 644-7-1 has been paid to the copyists, and the balance, namely, Rs. 312 0-8, credited to Government.

The maps and records have been all completed and despatched to the Settlement Officers.

Mr. H. Coupland, Assistant Settlement Officer, was in charge of the Settlement Office at Sewan, and Babus Surendra Nath Chakravarti and Bhowani Pershad were appointed as *khanapuri* officers. The latter was transferred in the beginning of March owing to the apparently little interest he showed in his work and he was replaced by Nand Kishore Lal. During the season three kanungos* were appointed to enquire into and settle interior disputes. The number of disputes settled by them amounted to 34,170. The system of appointing these kanungos is an excellent one, but as several petitions have been lodged against their decisions, especially in the case of Babu Bansgopal Lal, I cannot but help thinking that the enquiries were made in a perfunctory manner, or that the strength of the establishment should be increased.

* *Viz.*, Maulvi Mukimuddin Ahmed, Babu Behari Lal, and Babu Bansgopal Lal.

The return of interior dispute files was dilatory in the extreme. At times there were two to three hundred dispute files in charge of each kanungo. It was not until the 30th of June that all the dispute files were received back into the survey office, on which date a great many of the villages concerned had been completed in records. All villages have been completed with regard to interior disputes with the exception of forty. These have had to be omitted, as the files were received back too late.

The revenue survey boundaries of 1844-45 agree fairly well with the existing boundaries. In all cases where large differences exist, the old boundaries have been shown on the original maps, and the traces supplied to the Settlement Department by a broken red line in red ink, together with a note on the body of the map.

The district boundary as laid down in Government Notification No. 2598, dated 27th September 1888, which defines the boundary for civil, criminal, and revenue purposes has been strictly adhered to, and shown on the original field maps. In the settlement traces, it has been omitted for the present, as the Collector of Saran intimated that a reference will be made to the Government, and a trace map has been supplied him for that purpose.

During the season under report the survey of the entire district of Saran has been brought to a close. This survey was commenced in the field season of 1892-93. The area completed is shown in the following tabulated statement:—

Year.	Traverse.	Cadastral.	Khanapuri.	Topographical.
	Sq. miles.	Sq. miles.	Sq. miles.	Sq. miles.
1892-93 ...	894	...	...	...
1893-94 ...	932	549	528	...
1894-95 ...	516	...	...	...
1895-96 ...	52	648	669	...
1896 97 ...	60	210	210	25
1897-98 ...	61(*a*)	555	555	28
1898-99 ...	265	548	548	57
Total ...	2,780	2,510	2,510	110

(*a*) These figures include an overlap survey in both the Ballia and Muzaffarpur Districts of 24 square miles.

The area of the Saran district, according to previous revenue surveys, was estimated to be 2,622 square miles, while that as arrived at by the present survey amounts to 2,620 square miles made up as follows: 2,510 square miles of cadastral and 110 square miles of topographical survey=2,620 square miles.

It should be noted that as it has been ruled that the mid-stream between districts should be held to be the district boundary, the area traversed will never equal that cadastrally and topographically surveyed. This is due to the fact, that in order to connect on to old work traverses are run along the opposite bank and the area contained within the polygon thus formed is shown as the area traversed. The services of officers is noted in paragraph 60 of this report.

The following members of the native establishment are deserving of special mention:—

Laljimal and Ramzan Ali, Head-inspectors.
Abdul Rauf, Basarat Ali, and Jagdam Sahai, Inspectors.
Harakh Narain, Accountant.
Ishri Pershad, Writer.
Imam Ali, Head Draftsman.
Abdul Wahid, Head Estimator.
Ahmad Ali, Record-keeper.

The total expenditure on the cadastral survey of Saran district during the year under report amounted to Rs. 71,740, of which Rs. 39,400 are debitable to detail survey completion of maps area and traces and the balance of Rs. 32,340 to record-writing, the completion of records, and compilation of statistics.

The resulting cost rates are as follows :—

	Per square mile.
	Rs.
Detail survey	72
Record writing	59

As no free labour was supplied, the expenditure under this head amounted to Rs. 6,127 which gives an incidence of Rs. 11·18 per square mile. This expenditure is included in the total costs.

Topographical Survey.

34. In accordance with the procedure laid down in 1896-97, a topographical survey was made of all villages lying in the Ganges, Gogra, and Gandak diaras and which did not come under the provisions of the Bengal Tenancy Act. The area thus treated is shown in the tabular statement below:—

District.	Thana.		Villages.	Square miles.
Saran ...	Chapra	...	4	2·22
		...	1	11·32
	Parsa	... ...	34	12·80
	Sonepur	... ...	22	30·49
		Total ...	61	56·83

In the area surveyed there were 37 boundary disputes which have all been settled.

The survey has been mapped on 105 sheets. All village sites were surveyed in blocks and all topographical features of any importance have been accurately mapped with a view to their being used in the compilation of the standard sheets.

The check survey comprises 260 linear miles of *partal* which gives an average of 4·57 linear miles of *partal* to every square mile surveyed.

The expenditure amounts to Rs. 719 which gives a cost rate of Rs. 13 per square mile.

Saran Badar Work.

35. For the reasons given in paragraph 34 of the Annual Report for 1897-98, the Badar Section of the Bengal Drawing Office was transferred to North Bihar, each cadastral camp being allowed to entertain a small badar establishment. This establishment during the current season undertook the completion of the badars of 1897-98. The following table shows the area dealt with :—

Villages	877
Fields	1,180,871
Square miles	555·27

In the above area, badars for only 582 villages were submitted by the Settlement Department. In these villages only 3,309 fields required correction

which gives a percentage of ·28 on the entire season's work. For 295 villages no badars were received.

The establishment consisted of three draftsmen and three computers.

As there were no more badars to be submitted by the Settlement Department at the attestation stage, all the original maps and area statements were despatched in the month of June last to the Bengal Drawing Office.

Darbhanga District.

Traverse Survey.

36. As the traverse programme in the Saran district neared completion and as the services of sub-surveyors became available, they were moved across to Darbhanga. By the 1st of February, the whole traverse section was employed in the latter district. The camp office arrived at Jhanjharpur on the 4th of February and remained there until the end of the season.

Out of the establishment of sub-surveyors, three were detailed early in November to carry out the traverse of the Darbhanga Municipality, the plots of which were required by the cadastral section, under Mr. C. S. Kraal to carry out the detail survey.

The area traversed in the Darbhanga district is shown in the accompanying statement:—

Thanas.	Pargana.	Number of villages and blocks.	Area in square miles.	Remarks.
1	2	3	4	5
Khajauli	Various.	11	12·53	Village survey.
Madhubani		255	217·32	
Phulparasan		330	388·87	
Darbhanga City ...		31	6·96	Urban and rayati area of Darbhanga Municipality.
Total villages ...	...	596	618·72	
Total blocks ...	...	31	6·96	

Field work was completed, including all revisions by the 20th April on which date the office proceeded to recess quarters at Mussoorie.

The previous season's origin was maintained, namely, the intersection of North Latitude 26°00′00″ and East Longitude 86°00′00″.

The area surveyed was divided up into three main circuits which were again subdivided into 35 sub-circuits. The average area of each sub-circuit is 17·68 square miles. In the 596 villages 700 sub-traverses at an average distance of 30 chains apart were run. The Darbhanga Municipality was divided into 31 blocks which contained 270 sub-traverses.

The total linear miles of new chaining is 2,356·63. Of this 138·16 are on main circuits, 288·93 on sub-circuits, 898·44 on village circuits, 915·16 on sub-traverses, and 115·94 in the Darbhanga Municipality. In order to ensure accuracy in chaining, the same method adopted in Saran obtained in Darbhanga. The correction applied to chaining was as follows:—

When the northing is + 1·66 links per 100 chains.
Ditto southing is + 1·23 do. do.
Ditto easting is + 1·07 do. do.
Ditto westing is + 1·75 do. do.

The corrections to the angular work was on the entire polygon +1′ in 28 angles, and —1′ in 30 angles, and on the new work +1′ in 42 angles and —1 in 86 angles.

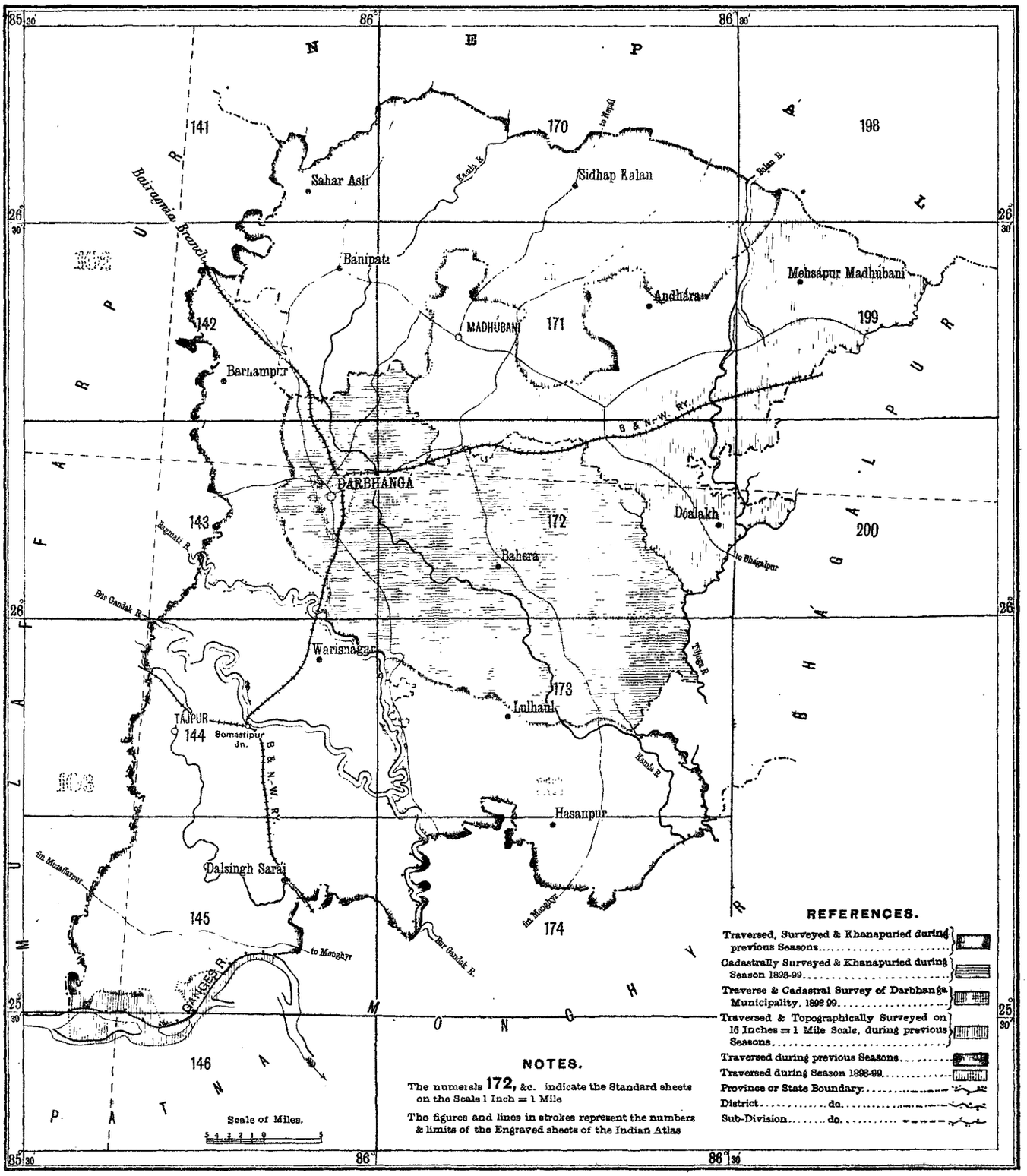
The mean magnetic variations deduced from the computation of 81 observations for Azimuth is 2°09′52″ East of the true meridian.

Azimuth observations to east and west stars were made at 81 stations on the main and sub-circuits at an average distance of 25 angles. During the season

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT DARBHANGA.

1898-99. No. 4 PARTY.



Reg. No. 513 S. I. D.—Jan. 1900.—1,150.

Photo. S. I. O., Calcutta.

No. 405-S. 1900.

under report 13,573 new stations were embedded, namely, 10,986 in villages and 2,587 in the survey of the municipality. Of these 799 were on main circuits, 1,793 on sub-circuits, 5,172 in villages, 3,222 on sub-traverses, and 2,587 on the blocks and sub-traverses of the Darbhanga Municipality. The following is the description of theodolite marks used:—

Stone prisms	1,054
Clay cylinders	9,749
Wooden pegs	183

In the survey of the Darbhanga Municipality 11 were marked by stone prisms, 175 by iron pins, and 2,401 by clay cylinders. Including "Shuru" and "Milan" angles, the theodolite was set up at 13,584 stations in the survey of villages and 3,189 in the survey of the municipality.

Connections were made to three tower stations of the north-east longitudinal series. A comparison of the direct distance obtained by traverses with that of the Great Trigonometrical Survey gives an error of—10·56 feet per linear mile.

Notices were previously issued through the Collector, and the demarcation was found to be generally satisfactory. The camp officer reports that he received every assistance from both zamindars and raiyats and found it unnecessary to impose any fines.

On the completion of the programme 655 trijunction stones were stocked at Jhanjharpur and 206 at Laheria Serai. These will be used during the coming field season. The health of the establishment throughout the season was excellent.

The computations have all been brought up to date, and there are no arrears of any kind whatever.

The services of officers are noted in paragraph 60 of this report.

The total expenditure incurred by this section in Darbhanga amounted to Rs. 21,013 which gives an incidence of Rs. 34 per square mile.

Cadastral.

37. The Darbhanga cadastral section was under the supervision of Mr. C. S. Kraal throughout the entire season. In order to secure adequate supervision of the work, Mr. Kraal had with him two Sub-Assistant Superintendents, Messrs. T. W. Babonau (Junior) and E. G. Hardinge and in addition to the above, two supervisors, Messrs. A. E. Le Franc and W. H. Babonau. The latter, whose health was indifferent, I regret to say, died at Digha during recess. The native establishment consisted of the following:—

Head Inspectors	4
Inspectors	34
Amins	340
Mirdhas	340

Besides these, there were 102 computers, draftsmen, tindals, &c.

This section left recess quarters at the latter end of October and commenced field operations on the 3rd of November. The entire programme, with the exception of three villages which were under water, and a portion of the Darbhanga Municipality, was completed by the 21st of April, on which date the section returned to recess quarters at Digha. In order to complete the three villages and that portion of the Darbhanga Municipality which remained for survey, two inspectors and a few amins were left to complete the former and one inspector and 12 amins the latter.

The programme consisted of the survey with records of all the villages lying in thana Bahera and a portion of thana Darbhanga. The entire area was divided into four circles. To each of these circles, one European officer, one head inspector, and an average of eight inspectors was allotted for the purpose of supervising the work of the amins.

The following tabular statement shows the class of amins employed:—

Local	143
Foreign	197
	340

With a few exceptions all the amins were old and experienced men. The outturn of each class of amin is as follows:—

Survey.

	Acres.
Local amins, per diem	18
Foreign amins, ditto	20

Khanapuri.

	Nos.
Local amins, per diem	59
Foreign amins, ditto	54

The outturn accomplished during the past season is given in the subjoined tabular statement:—

Thana.		No. of villages.	No. of fields.	Area in square mile.
Bahera	Various parganas ...	446	736,488	450 14
Darbhanga		470	394,776	233·68
	Total ...	916	1,131,264	683·82

The average size of the field calculated on the area *khanapuried* was ·38 of an acre.

Notwithstanding the small size of the field and the intricate nature of the *patidari* tenure, the entire programme has been completed. As in previous seasons no free labour was supplied. A uniform rate of one-and-a-half annas per diem was paid throughout the season. In a few villages touching on the Darbhanga Municipality, in order to expedite the completion of the work, and as coolies could not be obtained at the ordinary rate of one-and-a-half annas per diem, it was found necessary to pay them at the rate of two annas.

The total expenditure on coolies amounted to Rs. 7,840-2-9, which gives an incidence of Rs. 11-7-4 per square mile.

The detail survey checked by Europeans was 1,136·91, and by inspectors 1,577·72, which gives a total of 2,714 63 linear miles.

The number of linear miles of *partals* run as above comes to 3·9 linear miles to every square mile of survey.

During the season 1·60 linear miles of independent *partals* were run to every square mile of survey. In village sites, in order to test the accuracy of the survey, 965 blocks were re-surveyed and 1,532 *partal* lines run.

The total number of khasra entries checked by the European officers amounted to 7,576 and by inspectors 283,581, which brings the total to 291,157 plots. This works out at a percentage of 26 on the total number of fields *khanapuried*. The above numbers do not include the entries checked by the Assistant Settlement Officers and kanungos of the Settlement Department. Throughout the area the temporary demarcation by means of earthen mounds done by the villagers was satisfactory. The boundaries as a rule agree well with the revenue survey boundaries of 1844-45.

During the season, there were 682 boundary disputes. Of these 403 were in thana Bahera and 279 in thana Darbhanga. Of these, 335 were settled during the field season and 347 submitted after the section had returned to recess quarters at Digha.

The process-fee notices issued during the field season amounted to 1,330. Of these, 999 were realised, for which a sum amounting to Rs. 749-4 was received. The camp officer reports that little or no obstruction was experienced from either zamindars or raiyats. The total amount realised by fines amounted to Rs 126. This amount was paid into the Laheria Serai treasury. A few fines remained for realisation at the end of the field season. These were handed over to the certificate officer.

The 16-inch scale was adopted in the cadastral survey of all villages. All village sites were surveyed on a scale of 64-inch = 1 mile. The entire cadastral area has been mapped on 1,337 16-inch sheets, and the village sites on the 64-inch = 1 mile scale on 655 sheets. The Darbhanga Municipality has been mapped on 94 sheets on the 64-inch scale.

All the records have been despatched to the Settlement Officer with the exception of ten villages which will be supplied to him early in November.

As in previous seasons stamped agreements with amins were taken, but notwithstanding this, 18 amins absconded during the field season and did not return to recess.

During the season the health of the section has been excellent. There were two deaths from dysentery and four from cholera.

During the season under report four kanungos were appointed by the Settlement Department to enquire into and settle interior disputes. There were 43,617 disputes effecting 67,873 fields. All these have been settled with the exception of disputes affecting 4,000 plots. The camp officers in charge of both the Saran an Darbhanga sections complain that the enquiries made by kanungos were in many cases unsatisfactory. Out of a total number 916 villages surveyed and *khanapuried* during the season, there were 598 *pattidari*, 131 *ijmali*, and 187 *wahid zamindari*.

From the statement below will be seen the intricate nature of the *pattidari* in a few of the villages surveyed:—

Name of village.	No. of Tauzis.	No. of Pattis.
Pindaraeh	22	45
Nawada	52	89
Pokhram	69	44
Anantpur	59	71
Malhipatti	57	20
Siso	55	23
Total ...	314	292

On the completion of the survey of villages touching on the Bhagalpur district an independent survey of the Darbhanga *cum* Bhagalpur districts was made and all discrepancies corrected at once.

During the season, the following villages have been *khanapuried* on the Cheraut system. This system admits of two or more amins doing the *khanapuri* at the same time using one serial. The results obtained have been most satisfactory:—

Name of village.	No. of fields.
Harsingpur	5,021
Karthu	10,116
Baghant	8,568
Havidih	13,304
Saho	8,605
Nari Bhadaon	6,741
Mehnam	8,665
Shahpur Gonaon	5,461
Basdeopur	9,167
Balbhadarpur	2,115
Athar	8,348
Total ...	86,111

The following table shows the indigo concerns with their outworks which fell within the area under survey:—

Name of Indigo concern.	Name of Outwork.
Hathauri	Bahera. Rasulpur.
Benipur	Harsinghpur.
Hati	Nil.
Pandaul	Lehra.
Raiam	Nil.
Anar	Nil.

In this portion of the district, except in villages belonging to the Darbhanga Raj, there were frequent cases of suppression of raiyats, the maliks endeavouring to claim land cultivated by the raiyats, as their *khudkasht*. The orders

issued by the Settlement Officer on the 8th January 1899, together with the a fine of Rs. 500 imposed on Babu Rai Ganga Pershad, put a stop to this practice, and little or no further trouble was experienced.

During the season, Rs. 2,404-10-5 were received from zamindars and others. Of this sum, Rs. 1,574-4-7 was paid to copyists and Rs. 830-5-10 credited to Government.

Durbhanga Badar work.

38. A staff of three estimators and three draftsmen were employed on the attestation badars of 1897-98.

All the badars have been completed and the maps and area statements despatched to the Bengal Drawing Office. The following statement shows the work which has been completed by the abovementioned badar establishment:—

Number of villages	965
Ditto fields	110,808
Ditto square miles	732·54

In this area badars affecting 4,411 fields contained in 590 villages were submitted by the Settlement Department, the percentage of badars being ·40 on the entire season's work.

The following officers of the Civil Service underwent a course of training in surveying, *khanapuri*, and general office work during the past season:—

Mr. Crump.	Mr. Cammiade.
„ Thomas.	„ Mellor.
„ Salkeld.	„ Gourlay.

My report on services of officers will be found in paragraph 60 of this report.

The total expenditure incurred amounted to Rs. 1,01,535. Of this Rs. 44,092 is debitable to detail survey, &c., and Rs. 57,443 to *khanapuri*, completion of records establishment.

The resulting cost rates being as follows:—

	Per square mile.
	Rs.
Detail survey	64
Record-writing	84

MUZAFFARPUR DISTRICT (DIARA).

Cadastral Survey.

39. During the field season 1897-98 three portions of villages lying in the diara in thana Paru, pargana Ratti, of the Muzaffarpur district, were surveyed topographically on the 16-inch scale, but as they formed portions of villages which had been cadastrally surveyed, and the records written and attested at the request of the Settlement Officer, a detail survey and record-of-rights were prepared during the season under report. From the following statement will be seen the area completed:—

District.	Thana.	Pargana.	Villages.	Fields.	Square miles.
1	2	3	4	5	6
Muzaffarpur ...	Paru ...	Ratti ...	Three portions	452	2·65

The detail survey is mapped on five sheets. In order to check the work a *partal* of 8 linear miles was run, which gives an incidence of 3·01 linear miles to every square mile of survey.

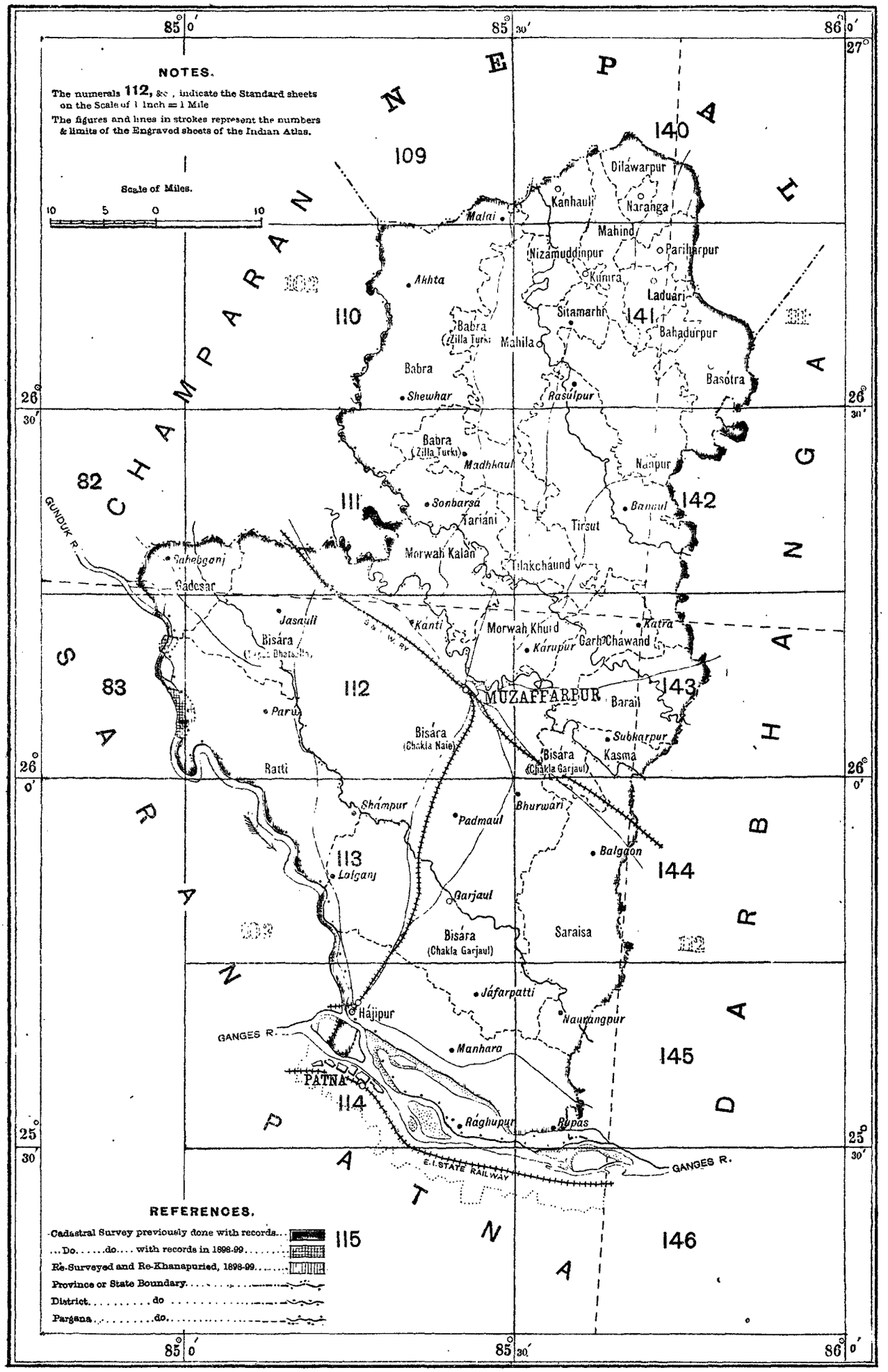
The record-of-rights comprises 452 plots, of which 85 entries were checked, or an average of 18·8 per cent.

The average size of the field is 3·75 of an acre.

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DIST. MUZAFFARPUR.

1898-99. No. 4 PARTY.



Reg. No 513 S. I. D.--Jan. 1900.--1,150.

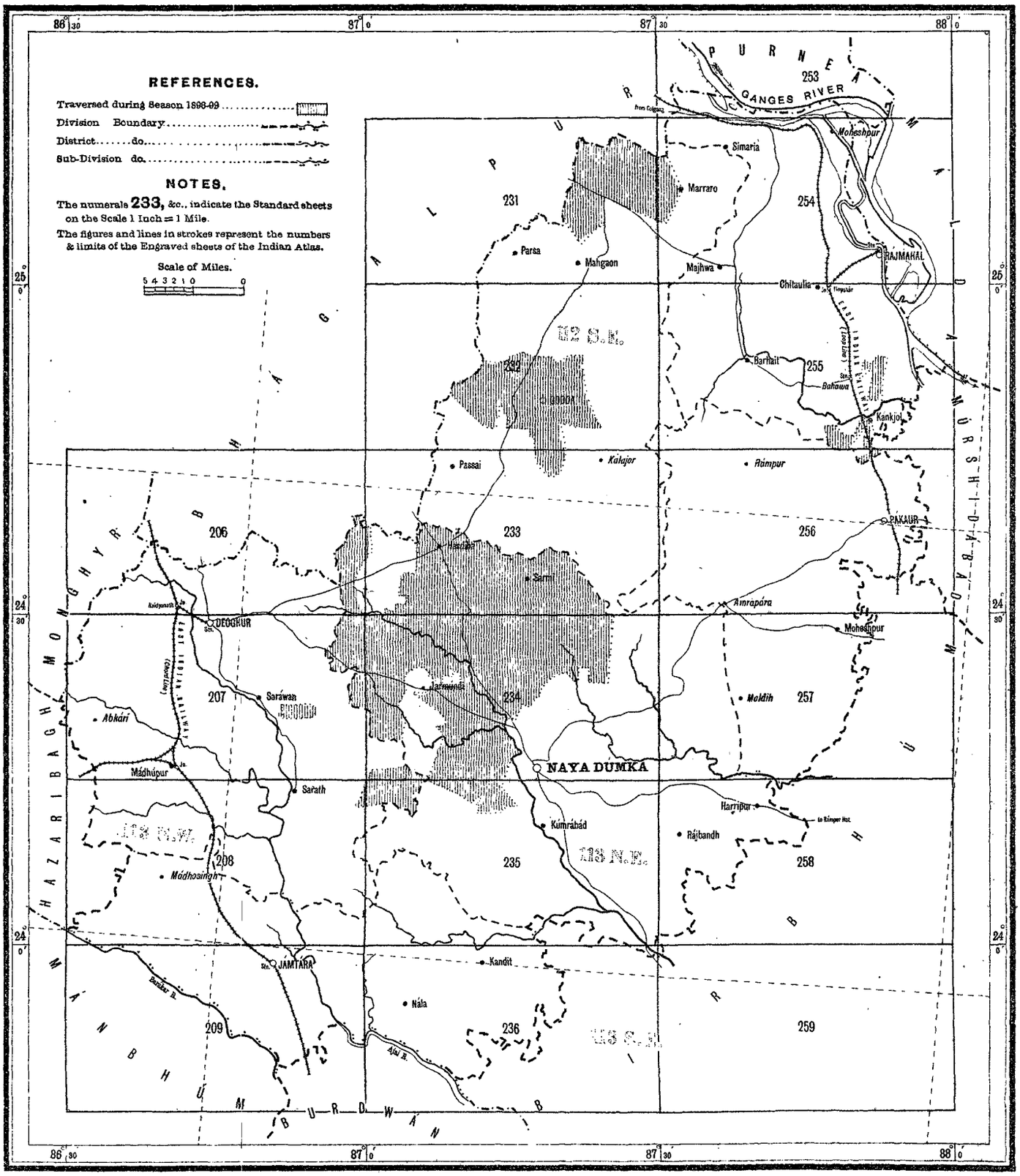
Photo. S. I. O, Calcutta.

No. 404-S. 1900.

BENGAL SURVEY.

INDEX TO THE TRAVERSE SURVEY IN DISTRICT SONTHAL PARGANAS.

1898-99. DETACHMENT.



Reg. No. 438. S. I. D.—Dec. 99.—1150.

Photo, S. I. O., Calcutta.

No. 610-S. 99.

The boundaries of these three portions were settled last field season when the topographical survey was carried out. An attempt was made by the zamindars to open the question, but the question could not be considered, as a revision could only lie on appeal. The total expenditure for this work is Rs. 120, which gives an incidence of Rs. 40 per square mile.

(Revision of Bazidpur village.)

Re-survey and Khanapuri.

40. The original survey of village Bazidpur, in pargana Ladwari, district Muzaffarpur, was completed in season 1895-96, but owing to complaints lodged by the raiyats that their holdings were not correctly surveyed, the work was heavily *partalled* during the recess season 1898. The results of these *partals* proved that the work was second class. There were in a large number of cases large discrepancies, many of which may have been due to changes which had occurred during the three years which has elapsed between 1895—98. The Superintendent of Settlement Surveys, Bengal, being dissatisfied with the results of these *partals* ordered that a new survey should be done. Five amins were employed on this work, which was commenced in November 1898 and completed on the 5th of March 1899. On the latter date, the Settlement Officer, North Bihar, issued orders that the entire village should be re-*khanapuried.* This was done on the Cheraut system by two picked amins, and was completed on the 22nd of April 1899. The entire area of the village is 1,684·55 acres, and contains 3,983 fields. In order to test the accuracy of the survey, 512·84 chains of *partals* were run and 837 plots checked. The total cost of this work amounted to Rs. 262 which will be borne by the Darbhanga Raj.

Sonthal Parganas District.

Traverse.

41. In compliance with the orders contained in Notification No. 2996L.R., dated 2nd September 1898, published in the *Calcutta Gazette* dated 7th September 1898, the settlement of the following estates was ordered:—

Division.	Pargana.	Taluk.	Villages.	Square miles.
1	2	3	4	5
Dumka ...	Hendweh ...	Amrapara ...	47	19
		Jartal ...	41	12
		Fuljhari ...	87	24
		Hendweh ...	197	54
		Siltha ...	70	45
		Kasba ...	45	19
		Dodhwa ...	70	33
		Bargo ...	52	16
		Baje ...	26	6
		Nawada ...	70	32
		Nawadaha ...	55	12
		Saran ...	81	38
		Daradeh ...	28	15
		Kharma ...	48	12
		Sahramara ..	53	16
		Jhapa ...	75	18
		Kamardiha ...	70	25
Godda ...	Godda and Amlomatia	.....	217	102
	Tappa Manihari	.....	411	76
Rajmahal ...	Mohabatpur ...	.....	32	15
Deoghar ...	.....	Garsara ...	80	27
		Total ...	1,855	616

In order to carry out the traverse of these estates, a detachment was formed under Mr. E. F. Berkeley, who was placed under the orders of Captain R. T. Crichton, then Superintendent, Settlement-Surveys, Bengal.

On the afternoon of the 12th November Mr. E. F. Berkeley made over charge of his duties in Camp II, No. 4 Party, and assumed charge of the Sonthal Parganas detachment on the forenoon of the 13th November 1898. After consulting with the Superintendent, Settlement-Surveys, Bengal, at Digha regarding establishments, indents, etc., he reached Dumka on the 20th, and commenced preliminary arrangements for taking the field.

In addition to the area mentioned in the first portion of this report, the areas, according to the statement appended below, were subsequently added to the programme:—

Name of subdivision.	Name of estate.	Tauzi number.	Number of villages.	Area in square miles.	Number and date of Notification.
1	2	3	4	5	6
Dumka ...	Taluk Hendweh	445	...	...	Notification No. 1687L.R., dated 18th April 1899, in *Calcutta Gazette* of 19th April 1899.
	(1) Beldaha	...	31	5·9	
	(2) Ekhmigha	...	4	2·2	
	Taluk Uparbahal	7	16	5·4	
Deoghar ...	Taluk Teliadih	583, 584, 587	5	1·3	Notification No. 444L.R., dated 9th June 1899, in *Calcutta Gazette* of 14th June 1899.
	Total ...	...	56	14·8	

Of these, the first three are situated within the periphery of main circuit Nos. 1 and 2. The fourth is a detached bit which lies about six miles west of main circuit No. 1. As the area is small, no connections were made to the remaining portions of the traverse.

The area shown in the two foregoing statements is only approximate. The following area extracted from the 1-inch maps is the area by subdivisions of the two combined statements:—

Subdivision.	Area in square miles.
Dumka	502·30
Deoghar	23·55
Godda	178·05
Rajmahal	22·10
Total ...	726·00

On the 24th and 25th of November, a conference was held at Naya Dumka to consult as to the best procedure to be adopted. At the above conference, the following officers were present:—

Mr. P. C. Lyon, Director of Land Records.
Captain R. T. Crichton, Superintendent of Settlement-Surveys, Bengal.
Mr. H. C. McPherson, Settlement Officer.
Mr. E. F. Berkeley, Extra Assistant Superintendent, Survey of India.
Maulvi Syed Ekram Hussein, Assistant Settlement Officer.

Amongst other matters discussed and settled at the conference, it was decided that Mr. E. F. Berkeley, in addition to his duties as officer in charge of the traverse camp should also exercise control over the cadastral camp under the direct supervision of Mr. H. C. McPherson. For this purpose he was gazetted as an Assistant Superintendent of Survey under [Act V (B. C.) of 1872] of the Bengal Tenancy Act, and also is an Assistant Settlement Officer, under rule III of the Sonthal Parganas Settlement Regulations of 1872.

Captain R. T. Crichton retained his powers of control and supervision of the cadastral camp.

It was also decided to open a training school for the purpose of teaching Sonthali and Dhiku amins. The school opened under the direct supervision of Mr. E. F. Berkeley on the 15th December 1898.

In addition to 112 Sonthalis and 80 Dhikhus trained, the following also went through a course of cadastral survey:—

Maulvi Said Ekram Hussein, Assistant Settlement Officer.
Messrs. Stark, Craden, and Robertson, Babu Jatindra Narain Mukerji

and kanungos:—

Mr. J. W. Martin and Babus Baidynath Rai, Rajkumar Makopadhya, Kailash Chandra Mojumdar, Dharum Das Hansda.

The establishment which composed the detachment consisted of the following:—

Mr. E. F. Berkeley in charge assisted by Mr. W. Newland, Sub-Assistant Superintendent, together with the following native establishment:—

One writer and accountant, 24-Sub-Surveyors.
12 Computers, draftsman, etc.

The greater portion of the work consisted of a compact block of 525 square miles lying to the north-west of the station of Naya Dumka. This block was divided into two main circuits which followed taluk boundaries.

Main circuit No. 3 consisting of about 105 square miles was situated about 13 miles north of the abovementioned block. Main circuit No. 4 is about the same distance north of main circuit No. 3.

Main circuit No. 5 encircled a small detached portion of about 22 square miles situated near the Kotal Pokur railway station to the extreme east of the district.

The 25 sub-circuits into which the main circuits were divided followed taluk boundaries. Where two or more taluks were included in one sub-circuit they were separated by running purdahs along their boundaries.

The area surveyed was to a great extent covered with low-lying hills and ravines, the paddy cultivation lying for the most part in ledges and hollows. There were no actual village sites, but the hamlets lay scattered over the high lands. The inhabitants consist of chiefly two classes—(1) Sonthalis, and (2) Dhikhus, the former being "children of the soil" and the latter "settled foreigners."

The camp officer reports that no serious opposition was met with except in Tappa Manihari—where the inhabitants, who bear a notoriously bad character, amused themselves by uprooting theodolite stations. This delayed the progress of the work considerably, the sub-surveyors being not only obliged to relay the stations but also to attend court as witnesses for the prosecution of the offending parties.

Field work was completed on the 1st June 1899, on which date the detachment moved into recess quarters at Naya Dumka.

The delay in completing field work was chiefly due to late receipt of orders and desertion of khalasis recruited from Hazaribagh. The proximity of Hazaribagh to the Sonthal Parganas is doubtless the reason for these desertions. The traverse rules laid down for the purpose of conducting traverse operations in North Bihar and elsewhere in Bengal were strictly adhered to as regards field work, with the exception of the orders regarding line clearing owing to the late receipt of orders, it was found impossible to have any line clearing ready in advance of the sub-surveyors. With reference to office work some modifications were necessary. These modifications were due to the fact that 16-inch plots were required by the Settlement Department before the sub-surveyors had been a month in the field. In order to expedite the supply of plots, field books were sent in as soon as ready instead of being sent in with the weekly returns. These were set up and all the traverse columns worked out and plots supplied as soon as possible. In this way corrections to the angular work were as often as not applied on adjoining villages which would not bear them. This procedure practically entailed the re-doing of the entire set up form, when the conditions applied to sub-circuits were balanced against those applied to villages and the angular corrections redistributed. The foregoing

change in office procedure entailed a great but unavoidable delay in supplying the Settlement Department with the Universal theorem areas. At the time of the old revenue survey of the districts, the country was covered for the most part by forests, and recognised villages were only in existence in cultivated tracts. With the exception of these cultivated tracts, the remaining area was surveyed in large blocks according to taluk boundaries together with interspersed hamlets.

In course of time as forest lands were opened out and cultivation extended, recognised villages were formed and a settlement became necessary. This was carried out under the supervision of Mr. Brown-Wood in 1873—79. The mauzas as formed during that settlement have been accepted as the unit during the present survey. As no maps of these villages were made, village boundaries were traversed according to local information obtained by the sub-surveyors from the headmen. In many instances two or more villages were traversed as one village and *vice versa*. This occurred, notwithstanding that lists prepared by the Settlement Department were supplied to each sub-surveyor.

In the taluks that have been surveyed cadastrally, all the necessary alterations in the sets up have been made, but this cannot be done in the remainder of the work at present.

The camp officer reports that the demarcation by means of earthen mounds was fairly satisfactory, being carried out through the "Parganites" or headmen of villages.

Trijunction points were marked by means of the usual stone prism obtained from the Bengal Stone Company and all intermediate theodolite stations were marked by baked clay cylinders obtained locally, with the exception of stations on disputed boundaries. These were marked by means of pegs.

The number of stations embedded is as follows:—

Stones	2,335
Baked clay cylinders	3,881
Pegs	14,764

Some stones still remain to be embedded. The reasons for this are as follows:—

(1) In the first instance the number of stones required was underestimated.

(2) On the arrival of the additional stones great difficulty was experienced in obtaining carts at Deoghar.

All stones which remained over were stored in the subdivisional office at Naya Dumka. During the season observations were made for Azimuth at 140 stations. Of these 128 were made to east and west stars and 12 to the sun. The average number of stations between stations at which Azimuths were observed is 28.

The number of linear miles of new chaining run during the past season amounted to 3,490. Of these, 365 are on main circuits, 216 on sub-circuits, 137 on purdahs, 2,005 on village circuits, 716 on sub-traverses, and 51 on connecting lines.

The area was divided into five main circuits, which were again subdivided into 25 sub-circuits. In sub-circuits, 25 purdahs were run, and in village polygons 958 sub-traverses at an average distance of 30 chain apart.

The theodolite was set up at 26,818 stations, or excluding "Shuru" and "Milan" angles at 20,980 stations.

The corrections applied to the angular work was + 1′ in every 9 angles and—1′ in every 11 angles.

The correction applied to chaining was where—

North is + 2	links per 100 chains.
South is + 1·9	ditto.
East is + 2·9	ditto.
West is + 0·8	ditto.

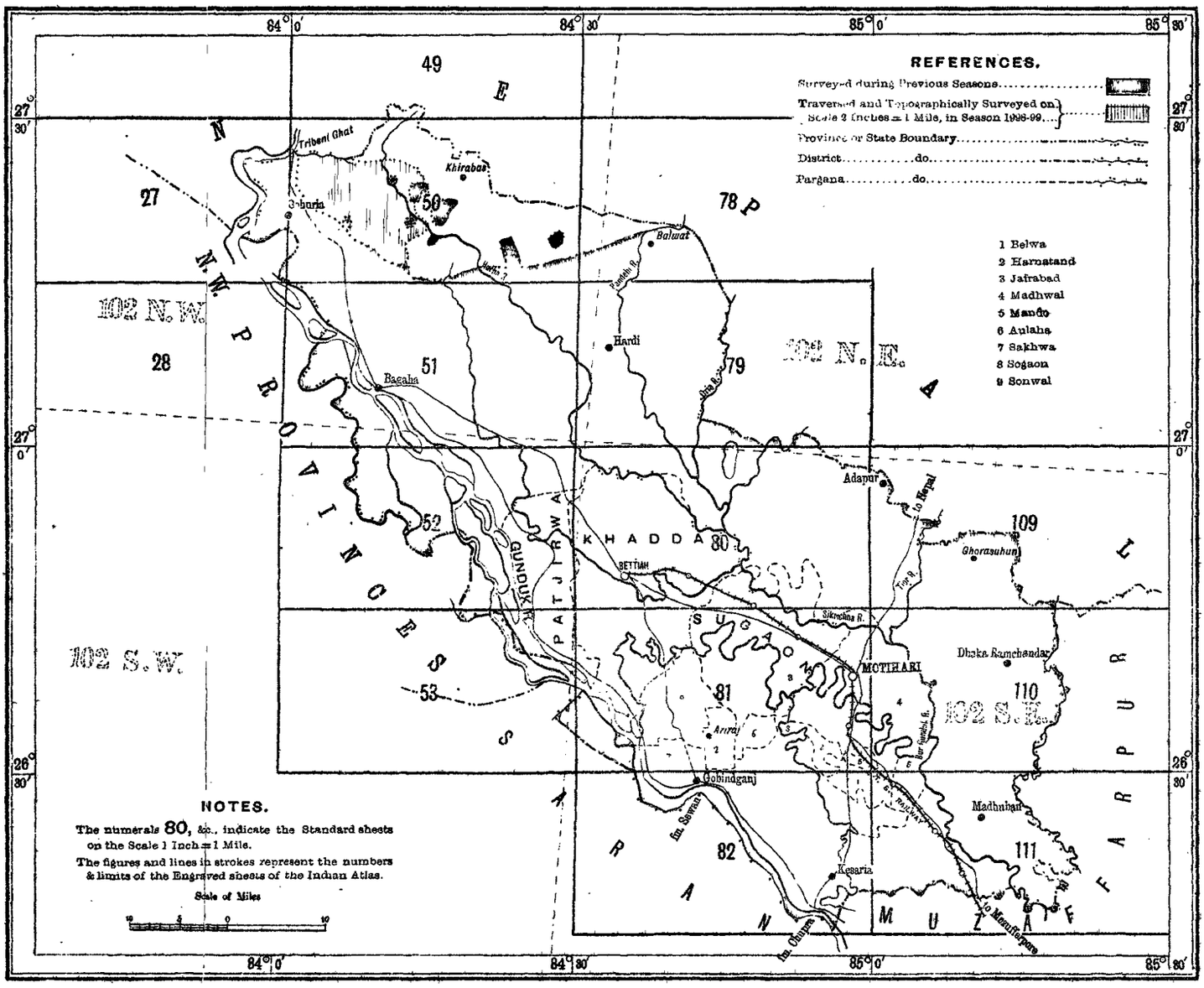
The above corrections apply to main circuits only. All the villages passed within the 10 per cent. average allowed for chaining and 1′ in every 5 angles.

The mean magnetic variation as derived from the 140 Azimuth observations is 2° 08′ 19″ east of the true meridian.

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT CHAMPARAN.

1898-99. No. 4 PARTY.



Reg. No. 513, S. I. D.—Dec. 99.—1,150. Photo. S. I. D., Calcutta.

No. 612-S 99.

Owing to the nature of the country, a mention of which is made in the earlier portion of this report in order to ensure the accuracy of the chain measurements, it was found necessary to use two chains, one of 100 links and one of 97 links. Each sub-surveyor was supplied with a spare chain which was checked weekly against the standard laid down in the camp by means of standard steel bars.

Angles of depression and elevation were taken when necessary.

Connections were made to four stations of the north Maluncha meridional series, namely:—

(1) Phuljari, H. S.
(2) Rangsar S.
(3) Mahuagarhi H. S.
(4) Barkop H. S.

In addition to the above, connections were made to the secondary stations of Gumra H. R. and the intersected stations of Tupahar and Lagoa. As there is some doubt about these stations owing to the marks having been worn away, only the principal stations have been used in proving the chaining.

The error in feet per mile, as deduced from the triangulated and traversed distances, is as follows:—

(1) Phuljari to Rangsar	4·5
(2) Phuljari to Mahuagarhi	2·7
(3) Mahuagarhi to Rangsar	4·1
(4) Mahuagarhi to Barkop	2·5

These results, considering the undulating nature of the area traversed, must be considered very satisfactory.

The origin selected was the intersection of North Latitude 20° 30′ 00″ and East Longitude 87° 30′ 00″.

The skeleton plots of 948 villages comprising 1,045 sheets on the 16-inch scale, have been supplied to the Settlement Officer. Of these, the cadastral survey with records of 735 villages, comprising an area of approximately 364 square miles, was completed by the Settlement Department.

The remaining plots will be supplied during October.

The health of the establishment throughout the season was excellent.

My remarks on the services of officers will be found in paragraph 60 of this report.

The services of the following members of the native establishment are deserving of special mention:—

Lalji Shahi, writer.
Ramesh Chandra Dey, head computor.
Sub-Surveyors Gafur Baksh, Azimuddin and Radha Nath Dhar.
Computors Ayan Pershad, Gobind Pershad, and Kurban Ali.
Draftsman Niam Uddin.

The total cost of the season's operations amounted to Rs. 32,693, which gives an incidence of Rs. 45 per square mile.

PART II.—REPORTS ON MISCELLANEOUS SURVEYS.

CHAMPARUN DISTRICT.

[Survey on a scale of 2-inch = 1 mile of the area omitted from cadastral survey in the north-western corner of the Champaran district.]

Traverse Survey.

42. The original programme sanctioned by the Government of India in letter No. 1905—92-4, dated 8th September 1898, from the Under-Secretary to the Government of India, Department of Revenue and Agriculture (Land Surveys), to the Surveyor-General of India, consisted of the traverse and topographical survey on a scale of 2-inch = 1 mile of that portion of the Champaran district, which was omitted from cadastral survey and also from previous topographical surveys, the area of which was approximately 172 square miles. This area was subsequently reduced to 125 square miles. Owing, however, to the unhealthiness of the tract under survey, the health of the entire establishment broke down, and sanction was obtained from the Surveyor-General to close field operations after 95 square miles had been completed. Mr. C. S. Gasper, Sub-Assistant Superintendent was in charge of the operations during the entire field and recess seasons.

The strength of the detachment was as follows:—

Surveyor Sher Shah.	1 Computers.
5 Sub-Surveyors.	6 Permanent tindals.
14 Field surveyors.	20 Temporary tindals.

115 Chainmen, line-cutters, and khalasis.

The detachment left Chapra for the field on the 20th January 1899. Field operations were commenced on the 25th of the same month. By the 20th of May the area completed in traverse and topographical survey amounted to 95·32 square miles. On that date the detachment returned to recess quarters at Digha.

The origin of survey was the same as that selected during the traverse operations of previous seasons, namely, the intersection of North Latitude 26°00′00″ and East Longitude 84°30′00″. The total number of linear miles of new chaining run during the season amounted to 91 linear miles.

The theodolite was set up at 872 stations or excluding "Shuru" and "Milan" angles, at 381 stations.

In order to check the angular work, observations were made for Azimuth to 18 east and west stars.

The mean magnetic variation as deduced from the above 18 observations is 1°58′07″ east of the true meridian.

Each sub-surveyor was supplied with two chains of unequal lengths, one of 100 links and the other of 93 links. Each of the sub-surveyors was also supplied with a spare chain, which was tested weekly with the standard laid down in the camp.

As no stations of the Great Trigonometrical Survey fell within the area under survey, no connections were possible. At the commencement of the field season, two sub-surveyors were employed in opening up the old traverse stations.

Topographical Survey.

43. The topographical survey on a scale of 2-inch=1 mile commenced on the 13th of March. The delay was due to the following causes:—

(*a*) Owing to the late receipt of orders, no arrangements could be made for having any line clearing done in advance of the traverse surveyors. The squads of the latter were strengthened and each sub-surveyor did his own line-cutting.

(*b*) The only computer attached to the detachment did not join until the 9th of February. This delayed the setting up and supply of field sections to the detail surveyors.

(*c*) Owing to the difficulty of obtaining trained topographical surveyors ordinary amins who had had no previous experience in hill surveying had to be entertained. All these men had to be trained before they were allowed to take the field.

The training class was opened at Harnatand on the 1st of February, and was in charge of Sher Shah, sub-surveyor, and closed on the 16th of March.

Surveyor Sher Shah was employed during the latter part of the season on checking the work of the amins *in situ* and on completion of the field work in running independent partals.

During the season there was only one boundary dispute, namely that between the Bettiah and Ramnagar Raj. The dispute referred to the source and course of Bhabsa river. It has been duly surveyed and a tracing showing both claims sent to the Settlement Department. A tracing on the 2-inch = 1 mile scale of the boundaries of the Champaran cadastral survey was obtained from the Bengal Drawing Office, the details of which have been carefully compared with the topographical survey. No appreciable differences have been found.

The limits and details of Colonel Tanner's survey have been compared with the present survey. In some places differences have been found of from two to four chains. These differences are chiefly due to change of the courses of many of the small streams which flow from the Sameswar Range and will have to be reconciled when compiling the 2-inch standard sheets. All the field sections and traverse records have been completed.

Each of the field surveyors were supplied with six coolies at a rate of one-and-a-half annas per diem. In the supply of coolies the camp officer reports

that he was greatly indebted to the assistance rendered him by the Manager of the Bettiah Raj.

The health of the establishment was indifferent throughout the whole field season.

In paragraph 60 of this report will be found my remarks on the services of officers.

The following members of the native establishment are deserving of special mention :—

Surveyor Sher Shah. (He rendered valuable assistance to the officer in charge, showing great interest in training amins and checking their work at the close of the field season).
Patandin, Mohuddin, subsurveyors.
Detail surveyors, Adith Sahai, Naz Ahmed Khan, and Ram Shankar Lal.

The total cost of the season's operations amounted to Rs. 9,545, which gives an incidence of Rs. 100 per square mile.

Sarun District.

Chapra Municipality.

44. At the request of the Chairman of the Chapra Municipality a survey on the 64-inch scale was undertaken of the urban area and a record of occupancy made.

The total area of the Municipality comprises 3,268 acres, of this 1,171 acres appertain to the urban area and 2,097 to the raiyati. The latter has been surveyed on the 16-inch scale in the ordinary course of the season's operations.

The urban area is comprised in two entire villages and portions of six others, and is mapped on 40 sheets.

There are 12,990 holdings and the average of each is ·09 of an acre. The extremely small size of each holding speaks in itself for the intricate nature of the work. The detail survey has been checked by means of an independent resurvey of the work in each of the 40 sheets, and has been further tested by 11 linear miles of test survey by European officers and independent *partals*. The number of linear miles of *partals* run by inspectors amounted to 18. The total linear miles of test survey is 29 which gives an average of 15·84 linear miles of test survey in each square mile.

In the record of occupancy 162 entries were checked by European officers and 3,203 by inspectors.

This gives a total of 3,365 entries checked with an incidence of 25·9 per cent. on the total number of holdings.

There were 351 internal disputes in the record of occupancy and four boundary disputes, all of which have been settled. The field work has been entirely completed, and there now remains the completion of the maps, the preparation of a wall map on the 16-inch scale, which includes the raiyati area, area extraction, a tracing of the 64-inch sheets to accompany the records, and the completion of the record of occupancy with one serial. This office work is most intricate and laborious, and most probably will not be completed until next field season. The total cost up to date has been Rs. 4,478.

Revilganj Municipality.

45. This Municipality has not been surveyed in detail, nor has a record of occupancy been prepared, owing to the Chairman of the Municipality having no funds to meet the cost.

The urban area is 1,078·70 acres which has been treated as a topographical survey on a scale of 16-inch=1 mile.

The work is mapped on six sheets and the topography has been checked by three linear miles of *partal*, which gives an incidence of 1·78 linear miles to each square mile of survey.

The urban area consists of the portion of three villages.

The raiyati area has been surveyed on the 16-inch scale and a record-of-rights prepared during the ordinary course of the season's operations.

Ballia-Saran Dispute.

46. During 1897-98 five villages in the Ballia district were omitted from traverse operations, and as it was late in the season when the omission was detected the survey was postponed until the season under report.

The object of the survey was to determine the district boundary between Saran and Ballia for administrative purposes.

This has been attained by a survey of the Gogra river, the deep channel of which forms the district boundary.

The area accomplished is given in the table below:—

	Villages.	Sq. miles.
Thana Bairia, pargana Kharid	5	13·08

The above area has been topographically surveyed on a scale of 16-inch=1 mile. The whole has been mapped on 17 sheets, and the work has been checked by 38 linear miles of *partal*, which gives an average of 2·90 linear miles to each square mile of survey. The village sites have been mapped in blocks and all necessary topographical detail carefully surveyed with a view to its being incorporated in the 2-inch standard sheets.

There were two boundary disputes, and these have been settled.

The total expenditure amounted to Rs. 150, which gives Rs. 12 per square mile.

Darbhanga District.

Darbhanga Municipality.

47. The survey of this Municipality was commenced in the month of February 1899 and completed on the 25th of August. The approximate area amounts to 4 square miles, containing 2,000 fields, and has been mapped on 94 sheets on a scale of 64-inch=1 mile.

In order to check the accuracy of the survey 5·5 miles of *partals* were run. The survey and record of occupancy has been completed.

Great delay was experienced in completing this work, owing to the lateness of the season, inclemency of the weather, and the unwillingness of the occupants of houses to allow the sub-surveyors to make a survey of the interior of courtyards.

The total cost amounted to Rs. 5,925, of which Rs. 1,757 are debitable to traverse survey and Rs. 4,168 to the preparation of a record of occupancy.

Revision of khanapuri of Babu Ganeshwar Pershad's area.

Cadastral Survey.

48. In accordance with orders received from the Superintendent, Settlement Surveys, Bengal, owing to there being some doubt as to the accuracy of the *khanapuri* done during the previous season in the estate of Babu Ganeshwar Pershad, Sulieman Khan, Inspector, with ten selected amins was sent to revise the *khanapuri*. The inspector and amins worked under the direct supervision of Maulvi Ashfaq Hossein, Assistant Settlement Officer. In each of the 24 villages comprising the estate, there were over 50 *bakhast* entries made during the *khanapuri* of the previous season. The 24 villages in question contained 23,462 fields and comprised an area of 22·2 square miles.

The total cost of this revision amounted to Rs. 1,831, which will be met by the proprietor.

Patna District.

Diara Cadastral Survey.

49. In Government Notification No. 2016L.R. of 6th May 1899, it was ordered that a survey should be made of all lands lying south of the southern boundary of district Saran, and that part of the southern high bank of the Ganges river which lies within the Patna district.

Prior to the issue of the above-quoted notification, the Settlement Officer ordered that all the lands referred to, should be topographically surveyed. This was accordingly done, but on its completion at the request of the Collector of Patna, ten of these villages were cadastrally surveyed and a record-of-rights prepared.

The area surveyed is as follows:—

Cadastral survey with records.

Thana.	Pargana.	Villages.	Fields.	Square miles.
Dinapore ...	Phulwari ...	4	3,800	6·49
	Maner ...	1	368	2·40
Maner ...	Maner ...	5	7,070	20·44
	Total ...	10	11,238	29·33

The whole of the above area has been mapped on 32 sheets, and the detail survey has been checked by 108 linear miles of test survey, which gives an incidence of 3·68 linear miles of test survey to each square mile of detail.

The number of entries checked in the records amounted to 2,387, which works out at an average of 21·2 per cent. on the total number of fields. The average size of the field is 1·67 of an acre.

The field boundaries in this tract are unique and worthy of note. They consist of imaginary lines, and for the purpose of survey were pegged out with stakes and clods of earth. In some cases they run in parallel and curved lines of over a mile in length, and are so close together that they resemble hill contouring. The village of Mangar Pal was largely disputed both externally and internally. In the latter case, it was found impossible without the disputes being settled, to complete the survey, as in many cases the fields as pegged out by the disputants not only overlapped but absorbed other fields to nearly a mile in extent.

The Khanapuri Assistant Settlement Officer failed to settle these disputes, his reasons being that as his services were required for attestation purposes, he had no time.

There were 22 boundary disputes. Of these, 19 have been settled, of which one file was sent by the Settlement Department to the Collector for the purpose of confirmation, but has not yet been received back in the Survey Office. For this reason, the maps and records still remain to be corrected.

The remaining three disputes refer to the village of Mangar Pal, and have not been returned by the Settlement Department. One of these files was mislaid or lost in the Settlement Office. A duplicate tracing has been supplied.

It is, I understand, the intention of the Settlement Department to settle these three disputes next field season, but it is very doubtful whether they will be able to do so; and it is to be regretted that they were not disposed of during the past field season.

The Ganges river has been in full flood and all the marks must necessarily be obliterated, in fact the physical changes will probably be so great, that an entirely new survey will be necessary.

The total expenditure for this work amounted to Rs. 1,647, of which Rs. 1,270 is debitable to detail survey, &c., and Rs. 377 to *khanapuri* and completion of records, giving an incidence of Rs. 57 per square mile.

Topographical Survey.

50. The outturn is given in the table below:—

	Village.	Sq. miles.
Thana Dinapur, pargana Phulwari	11	10·61

The topographical area is on a scale of 16-inch=1 mile and comprise 17 sheets. The detail survey has been checked by 54·linear miles of *partal*, which gives an average of 5·09 linear miles to every square mile surveyed.

The topographical details have been accurately mapped for the purpose of the 2-inch standard mapping, and all village sites have been mapped in blocks.

There were 11 boundary disputes in this area, and these have been settled.

The expenditure amounts to Rs. 120 or Rs. 11 per square mile.

SHAHABAD DISTRICT.

Relaying of the disputed boundary between the Kachuar and Banskatti Mahals.

51. The survey of this dispute was commenced in season 1893-94 under the supervision of Major G. B. Hodgson, but owing to none of the marks said to have been embedded by Sub-Surveyor Irfan Ali in 1897-98 being traceable, Captain Crichton deputed Sub-Surveyor Sarju Pershad. Apparently, *vide* paragraph 66, page 37 of the Annual Report for 1897-98, the Sub-Surveyor misunderstood the orders sent him. With a view to testing the survey as done by Sub-Surveyors' Irfan Ali and Sarja Pershad, Mr. C. S. Gasper was deputed during the season under report for the work.

Mr. Gasper reports that all the stations along the revenue survey boundary laid down by Sub-Surveyor Irfan Ali have been marked with stones about two feet to three feet high; also with rocks with small stones piled round them.

Some of these stones were fixed by Irfan Ali, Sarju Pershad, and some by Mr. Gasper. The permanent marking of the stations laid down by the above-mentioned officers was not carried out during the season under report. Mr. Gasper's services being urgently required for the relaying of stations on the Nepal boundary. As soon as the marks are ready, arrangements will be made to complete the demarcation during the ensuing field season.

The total expenditure incurred on this work amounts to Rs. 789.

Dumraon Raj Cadastral.

52. In this district, the Dumraon Raj applied for a detail survey with records of two villages situated in the Gogra river adjoining the Saran district. In addition to these two, the Settlement Officer issued orders for a cadastral survey of six villages with reference to the diara line.

The following table shows the details of the above survey:—

			Villages.	Fields	Sq. miles.
Thana Arrah	pargana Arrah	...	4	6,144	18·43
	„ Baragaon	...	4	2,989	7·43
	Total	...	8	9,133	25·86

The above area has been mapped on 29 sheets.

The detail survey was checked by 106 linear miles of test survey, which gives an incidence of 4·10 linear miles of test survey to each square mile of detail.

The number of entries checked in the field records was 2,356, which gives an average of 25·8 per cent. on the total number of plots.

The average size of the field is 1·81 of an acre.

There were twelve boundary disputes. Many of these were very intricate involving several hundreds of acres The village of Shitab diara was disputed on all sides to a very great extent. All these disputes have been settled, but the file of one, namely, Kotwa Path Rampur *versus* Dhusaria was sent to the Collector for confirmation, and has not yet been returned to the Survey Office for the completion of the maps and records. The total expenditure on this work amounted to Rs 1,237. Of this, Rs 185 is debitable to traverse, Rs. 762 to detail survey establishment, and Rs. 290 to *khanapuri*, statistics &c.

The cost rate per square mile being Rs. 48.

Diara Topographical Survey.

53. All the permanently-settled estates in the Shahabad district situated in the diara of the Gogra and Ganges rivers have been topographically surveyed on the 16-inch scale, the details of which are given in the subjoined statement:—

			Village.	Square miles.
Thana Arrah	pargana Arrah	...	10	21·97
	„ Baragaon	...	3	3·11
	Total	...	13	25·08

This work has been mapped on 31 sheets. The area surveyed was checked by 69 linear miles of *partal* which gives an average of 2·75 square miles to each square mile of survey. All necessary topographical details have been accurately mapped with a view to their being incorporated in the 2-inch standard sheets, and all village sites have been surveyed in blocks.

There were five boundary disputes, which have been settled.

The expenditure amounted to Rs. 238 or Rs. 10 per square mile.

Dumraon Raj Ballia Dispute.

54. In accordance with the request of the Collector of Shahabad conveyed in his letter No. 4074G., dated 22nd March 1899, a survey of five estates in pargana Bhojpur, in district Shahabad, was undertaken for the purpose of comparing the present boundaries with these of the reevnue survey of 1845-46 and

of showing to what extent the areas were effected. The area accomplished is given in the following table:—

	Estates.	Sq. miles.
Thana Dumraon, pargana Bhojpur ...	5	14·21

The traverse operations commenced on the 27th April 1899 and completed on the 3rd of June.

The theodolite was set up at 184 stations which were marked by pegs.

The linear miles of new chaining amounted to 62·86.

The five estates were encircled by one sub-circuit and two Azimuths were observed for the purpose of checking the angular work.

Each estate was then traversed separately according to the demarcation done by the Dumraon Raj, and subdivided by means of 13 minor traverses.

During the course of survey eight old stations were found and utilised as theodolite stations, thereby rendering the comparison of boundaries more effective.

The topographical survey on the 16-inch =1 mile scale was commenced on the 15th June 1899, and completed on the 1st of July 1899.

All the village boundaries, topographical details, and the present course of the Ganges river have been carefully surveyed. In addition, the claim of the Dumraon Raj has been shown on the map.

The five estates are mapped on 34 sheets and the detail survey has been checked by 27 linear miles of *partal*, which gives an average of 1·90 linear miles per square mile surveyed.

In the trace map which accompanied the Collector's letter, and which was surveyed by the Settlement Department, on the 8th February 1898, the revenue survey boundaries have been shown, but are not in accordance with the revenue survey boundaries of 1845-46. In 1845-46, the main channel of the Ganges river did not form the boundary opposite the five estates in question. The true district boundary is a branch of the Ganges river which started from revenue survey mauza No. 285 Mijharia and joined the main channel again at revenue survey mauza No. 163 Barnahi Kalan. In the reference given in the Collector's trace map, it is stated that the red-dotted line represents (amongst other items) the boundaries of Umarpur. This village does not appear in the revenue survey volume of the Shahabad district, and apparently only came into existence at the time of the diara survey of 1881-82.

A congregated map on the 4-inch =1 mile scale has been compiled of the five estates. On this the Dumraon Raj claim and the revenue survey boundaries of 1845-46 have been shown.

The total area surveyed is 9,108·19 acres, of which the Dumraon Raj claim 5,652·54 acres, but according to the revenue survey boundary of 1845-46, obtained from the maps received from the office of the Collector of Shahabad, they are only entitled to 2,049·36 acres.

In paragraph 6 of the Collector's letter No. 4074G., dated 22nd March 1899, it is stated that the main object of the survey is to ascertain on comparison with the revenue survey of 1844-45 whether the five estates are formed of lands of nine other permanently-settled estates of the Dumraon Raj and to what extent the lands of the latter are included within the limits of the former. As no survey has now been made of the nine permanently-settled estates, the limits can only be compared *en bloc* according to the district boundary as it existed in the revenue survey maps of 1845-46. This has been done.

The expenditure on this survey amounts to Rs. 461 or Rs. 32 per square mile. This sum will be recovered from the Dumraon Raj through the Collector of Shahabad.

Bhagalpur and Purnea Districts.

Nipal Frontier.

55. This work which consisted of the following was under the supervision of Mr. C. S. Gasper, Sub-Assistant Superintendent—

(*a*) Examination and relaying and of the stations of the traverse survey done by Mr. G. F. Berkeley during the season 1897-98.

(*b*) Refixing wooden posts Nos. 76 and 82 which had been washed away.

(*c*) Removal of wooden posts 67 to 71.
(*d*) Survey of the Nuna river and refixing of wooden posts Nos. 23, 24, and 30.

Arrangements having been made between the Nepalese representative and the Sub-divisional Officer of Supaul to meet at Birpore on the 18th December 1898, Mr. C. S. Gasper, Sub-Assistant Superintendent left Dinapur on the 8th for the purpose of inspecting and relaying any stations of the traverse survey run by Mr. E. F. Berkeley during 1897-98, and which had been washed away by the Kosi river.

Mr. C. S. Gasper reached Birpore on the 10th December, and, after engaging coolies, commenced work on the 13th of the same month.

Out of the 14 stations embedded by Mr. E. F. Berkeley between pucka pillars 11 to 14, nine were found intact, the remaining five being washed away by the river. These were relaid and the professional portion of the work completed by the 17th December.

On the 18th December Mr. C. S. Gasper, accompanied by the Subdivisional Officer of Supaul and the Nepalese Suba, proceeded to refix wooden posts Nos. 76 and 82.

Finding from measurements that the site of wooden post No. 82 fell in the centre of the dry bed of the Kosi river, it was decided not to erect a post at this point. As the site of wooden post No. 76 also fell within the bed of the river, with the consent of the Nepalese Suba, it was decided to erect it four chains south of last year's site. Reference pillars were erected in order to fix the site of pucka pillar No. 13 and in order to accurately determine the sites of these reference pillars, two sub-traverses were run by means of a theodolite. This work was set up and plotted on the 4-inch map prepared previously by Mr. E. F. Berkeley, and a copy of the data and trace showing the position of the reference pillars given to the Subdivisional Officer of Supaul.

As the Subdivisional Officer, Supaul, was unable to obtain a sufficient supply of bricks and mortar in the vicinity of Birpore at the time of survey pucka platforms two feet by two feet were erected.

This work having been completed, Mr. Gasper proceeded to fix the position of the two wooden posts between wooden posts Nos. 43 and 44 referred to by Captain Crichton in paragraph 68, page 40 of the Annual Report for 1897-98. As it was found that the sites of these pillars fell on the western bank of the Kosi river and hence in Nepal Territory, the Nepalese Suba agreed to the erection of reference pillars, but at the same time stipulated that half should be on the Nepal side of the boundary and half in British territory. Subsequently after arrangements had been made for the erection of these reference pillars, the Nepalese official requested Mr. Gasper and the Subdivisional Officer of Supaul to stay further proceedings until he had referred the question to the Nepalese Darbar. As nothing further could be done *robakaris* were drawn up and signed by Mr. Gasper, the Subdivisional Officer, and the Nepalese Suba on the 20th December 1898.

Araria subdivision, district Purnea.

56. On the morning of the 23rd December Mr. Gasper proceeded to fix wooden posts 67 to 71 in their true positions. This work was completed on the same day and *robakaris* drawn up and signed.

Survey of the Nuna river and refixing of wooden posts, Nos. 23, 24, and 30.

57. In compliance with the request of the Magistrate of Purnea conveyed in his letter No. 1666J., dated 17th October 1898, on the 31st December, Mr. Gasper, accompanied by the Subdivisional Officer of Araria, proceeded to Sikti thana, where he was joined by the Nepalese Lieutenant of Rangli. From Sikti they proceeded to the Nuna river, and the following work was completed:—

(1) Embedding temporary posts along the midstream boundary according to the map of 1874-75.
(2) Survey of the present course of the Nuna river.
(3) Fixing on the map the true position of the two unnumbered posts.

This work was completed on the same day, but as the Lieutenant of Rangli refused to draw up and sign a *robkari* alleging as his reasons that he had received no instructions from the Darbar to do so, Mr. Gasper and the Sub-divisional Officer left for the head-quarters of the Arraria subdivision.

On the 4th of January Mr. Gasper inspected the sites of wooden posts Nos. 23,24, 25, and 30 which were reported as missing by the Sub-Inspector of the Matiari thana. It was found that wooden post No. 23 was still in existence but that Nos. 24,25, and 30 had been washed away. As the Nepalese representative was not present, temporary marks were erected on the sites of wooden posts Nos. 24 and 30, and the Subdivisional Officer was supplied with a trace to enable him to erect permanent marks as soon as the Nepalese official arrived. The work which remains to be done during the coming season is the fixing of reference pillars for two stations and punka pillar No. 14.

The total expenditure incurred on this work amounts to. Rs. 716.

CHAPTER III.

PART I.—PROGRAMME FOR THE BENGAL SURVEYS DURING 1899-1900.

58. According to information at present available, the following tabular statement shows the area to be surveyed during the coming field season:—

District.	Traverse.	Cadastral with records.	Topographical Surveys.		
			16-inch scale.	4-inch scale.	2-inch scale.
1	2	3	4	5	6
Darbhanga	...	941	...	...	...
Monghyr	655	...	...	...	...
Backergunge	600	...	...	...	...
Sonthal Parganas (Damin-i-Koh).	700	...	...	...	...
Champaran	80	...	...	...	8(*a*)
Nepal Boundary	(*b*)	Relaying boundary works.			
Kachuar Mahal ...	(*c*)				
Noakhali	50	...	...	50	...
Jowhi Vill (Ballia) ...	(*d*) 7	7	...	...	...
Total ...	2,092	948	...	50	80

(*a*) Cost to be met by Government of India.
(*b*) Ditto by Political Department.
(*c*) Cost to be met from Bihar Budget.
(*d*) Ditto by Dumraon Raj.

The area to be cadastrally surveyed in the Darbhanga district will be completed by two camps.

During 1900-1901 one cadastral camp will be transferred to the Monghyr district in order to carry out the cadastral survey and preparation of a record-of-rights of the area traversed during the ensuing field season. The traverse of the Backergunge district has not yet been sanctioned.

The traverse of 700 square miles in the Damin-i-Koh district will be carried out by the Sonthal Parganas detachment under Mr. E. F. Barkeley.

The area to be topographically surveyed in the Champaran district will be completed by a detachment under Mr. W. T. Babonau.

The arrangements for completing the topographical survey of Noakhali depend on whether sanction is accorded for the initiation of a traverse survey in the Backergunge district.

Officers will be deputed for relaying stations on both the Kachuar and the Nepal boundaries.

PART II.—TOURS OF THE SUPERINTENDENT OF SETTLEMENT SURVEYS.

59. As Captain R. T. Crichton has left no notes regarding the number of days he was on tour, I am unable to give any information concerning them.

During April I was on tour for eight days, inspecting both the cadastral and the traverse sections.

On the 3rd of July I proceeded to Calcutta, stopping at Digha, where I inspected both the Darbhanga and Saran cadastral sections, together with the Champaran detachment and returned to Mussoorie on the 19th.

PART III.—SERVICE OF OFFICERS.

60. Lieutenant A. Mears was attached to the traverse camp for the greater part of the season and accompanied the Assistants on tour when inspecting the cadastral camps. At the end of the season he was attached to the controlling office for the purpose of obtaining an insight into the procedure. He takes great interest in his work, and by the end of the present season should make a most capable cadastral officer, and should be fully qualified to take charge of the Bengal Survey operations.

Mr. H. Dowman, Extra Assistant Superintendent, has been in charge of the traverse section throughout the season, and has worked to the entire satisfaction of both Captain Crichton and myself. In my opinion he is quite capable of taking charge of a party.

Mr. A. W. Smart, Extra Assistant Superintendent, fifth grade, has had charge of the cadastral section in Saran. Regarding his services I cannot do more than fully endorse the opinion expressed by Captain Crichton, namely, that "he is quite one of the best cadastral officers in the Department."

Mr. C. S. Kraal, Extra Assistant Superintendent, sixth grade, has held charge of the Darbhanga cadastral section. The area accomplished by him, namely, 683 square miles, containing close on 1,200,000 of fields fully prove him to be a most capable cadastral officer.

Mr. E. F. Berkeley has held charge of the Sonthal Parganas traverse detachment and also Supervisor of the cadastral camp, and has given every satisfaction in the way he has performed his duties.

Mr. T. W. Babonau, Sub-Assistant Superintendent, first grade. Mr. C. S. Kraal reports that Mr Babonau has shown great interest in his work and deserves credit for the work done by him.

Mr. C. S. Gasper, Sub-Assistant Superintendent, first grade, was placed in charge of the Champaran traverse and topographical detachment, and has worked well and zealously throughout the entire season. Considering the establishment with which he had to work and the unhealthiness of the district he deserves credit for the supervision of the camp.

Messrs. H. H. B. Hanby and P. L. Causley, Sub-Assistant Superintendents, second grade, have both worked well during the past field season, and have shown great interest in their work.

Mr. C. S. Kraal also reports well on the work done by Mr. LeFranc, Supervisor.

PART IV.—CO-OPERATIONS OF LANDLORDS, &c.

As in previous seasons every assistance has been rendered by Mr. E. Macnaghten, Secretary of the Indigo-Planters Association, and all managers and assistants of indigo concerns which fell within the area under survey.

Co-operation of Revenue Officers.

During the short time I have been in charge I have received valuable assistance from both Mr. C. Stevenson-Moore and his successor, Mr. Kerr. My relations with Mr. P. C. Lyon have always been most cordial.

In conclusion, I have to express my indebtedness to all officers in charge of camps and detachment for the excellent reports submitted by them at the end of the present survey year, especially to Messrs. A. W. Smart and E. F. Berkeley, whose reports have been almost quoted *verbatim*.

I have the honour to be,

SIR,

Your most obedient servant,

C. W. H. SYMONDS, *Capt.*,

Offg. Superintendent of Settlement Surveys, Bengal.

APPENDIX I.

Summary of the outturn of work of the Survey Parties in Bengal for the year 1898-99.

Scale of Survey.	Locale of field operations.		Traversing.						Topographical Survey.		Cadastral Survey.					Number of sheets.	Record-writing.		
	Division.	District.	Number of villages.	Square miles of village survey.	Linear miles.	Number of stations at which the theodolite was set up.	Number of azimuths.	Number of great trigonometrical connections.	Number of villages.	Area in square miles.	Number of villages.	Area in square miles.	Number of fields.	Number of linear miles of test survey.	Average size of fields in acres.		Number of villages.	Number of fields.	Area in square miles.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		Private estates.																	
16″ = 1 mile ...	Patna	Saran	293	265	915	4,839	38	...	...	...	1,066	548	1,157,451	3,516	0·30	1,825	1,066	1,157,451	548
		Do. (Diara Topographical) ...	...	...	...	...	...	...	(*d*)64	(*d*)59	...	...	...	(*d*)263	...	(*h*)111	...	...	...
		Darbhanga	596	619	2,241	13,584	81	3	...	...	916	684	1,131,264	2,715	0·38	(*e*)1,992	916	1,131,264	684
		Muzaffarpur	...	...	...	...	...	...	...	...	(*b*)3	3	452	8	...	5	(*b*)3	452	3
		Ditto (Bizidpur village)	...	...	...	...	...	...	...	...	1	3	3,983	6	...	...	1	3,983	3
16″ = 1 mile ...	Bhagalpur ...	Sonthal Parganas	1,936	726	3,490	26,818	140	4	...	...	...	...	...	...	...	...	...	...	...
		Miscellaneous.																	
2″ = 1 mile ...		Champaran (Topographical)	...	95	91	872	18	...	...	95	...	...	...	...	...	...	...	...	...
64″ = 1 mile and	Patna	Darbhanga (City)	(*a*)31	7	116	3,189	...	...	...	...	37	4	32,000	5	(*i*)..	(*f*)94	37	32,000	4
16″ = 1 mile.		Saran (Chapra City)	(*a*)40	2	58	2,906	...	...	...	...	(*c*)8	2	12,990	11	·09	40	(*c*)8	12,990	2
16″ = 1 mile ...	Gorakhpur ...	Ballia (Diara Topographical)	...	...	...	...	...	...	5	13	...	...	...	(*h*)38	...	(*h*)17	...	...	...
		Patna (Diara villages)	...	...	...	...	...	...	...	...	10	29	11,238	108	1·67	32	10	11,238	29
		Do. (Diara Topographical)	...	...	...	...	...	...	11	11	...	...	...	(*h*)54	...	(*h*)17	...	...	...
		Shahabad (Dumraon Raj / Ballia dispute.)	5	14	63	184	2	...	5	14	...	...	...	(*h*)27	...	(*h*)34	...	...	...
16″ = 1 mile ...	Patna ...	Shahabad (Diara villages) ...	...	...	...	...	...	...	...	...	(*g*)8	(*g*)26	9,133	106	1·81	29	8	9,133	26
		Do. (Diara Topographical.)	...	...	...	...	...	...	13	25	...	...	...	(*h*)69	...	(*h*)31	...	...	...
		Darbhanga	...	...	...	...	...	...	...	...	...	...	...	...	...	...	24	23,462	22
		Revision of Khanapuri of Babu Ganeshwar Prasad Singh's area.																	
		Total ...	2,901	1,723	6,974	52,392	279	7	98	217	2,049	1,299	2,358,511	6,926	...	4,227	2,073	2,381,973	1,321

(*a*) These are blocks.
(*b*) These are portions of villages.
(*c*) Inclusive of portions of six villages.
(*d*) Includes portions of three villages, 2 square miles, 6 sheets, 3 linear miles, of Survey of Ravelganj Municipality on 16″ scale, Topographical.
(*e*) Includes 655 sheets on 64″=1 mile scale, village sites.
(*f*) On 64″ scale.
(*g*) Includes Shitabdiara and Dhusaria villages. Area 16·47 square miles.
(*h*) 16″ scale topographical.
(*i*) Cannot be given at present.

C. W. H. SYMONDS, *Captain*, I.S.C.,
Offg. Supdt. of Settlement-Surveys, Bengal.

APPEN

Statement showing the sums expended on each descrip

Description of Work.	BHAGALPUR DIVISION.				PRIVATE PATNA													
	Sonthal Parganas.				Saran.				Saran—Diara Topographical.				Darbhanga.				Muzaf	
	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.
	1				2				3				4				5	
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Demarcation	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Stone embedding	2,126	335	98	2,559	201	30	9	240	...	...	...	...	852	128	39	1,019	...	...
Traversing	24,479	4,458	1,197	30,134	7,720	1,255	359	9,334	...	...	...	...	16,283	2,942	769	19,994	...	...
	26,605	4,793	1,295	32,693	7,921	1,285	368	9,574	...	...	...	...	17,135	3,070	808	21,013	...	...
Survey, cadastral	...	...	...	...	28,604*	5,301	1,356	35,261	300	45	14	359	28,770†	5,582	1,374	35,726	50	8
Completion of field maps ...	...	...	...	...	1,072	141	48	1,261	100	15	5	120	...	...	...	...	...	...
Area extraction	...	...	...	...	1,384	173	62	1,619	100	15	5	120	5,922	938	274	7,134	...	...
Traces	...	...	...	...	1,071	140	48	1,259	100	15	5	120	1,045	140	47	1,232	...	...
	...	...	...	...	32,131	5,755	1,514	39,400	600	90	29	719	35,737	6,660	1,695	44,092	50	8
Record-of-rights (khanapuri)	...	...	...	...	22,840	4,196	1,081	28,117	...	...	...	...	38,188	7,055	1,810	47,053	50	8
Completion of records	...	...	...	...	2,464	390	114	2,968	...	...	...	...	6,139	970	284	7,393	...	...
Statistics	...	...	...	...	1,067	140	48	1,255	...	...	...	...	2,489	393	115	2,997	...	...
	...	...	...	...	26,371	4,726	1,243	32,340	...	...	...	...	46,816	8,418	2,209	57,443	50	8
Arrears traversing	...	...	...	...	...	...	...	...	...	...	...	...	362	45	16	423	...	...
Do. survey, cadastral ...	...	...	...	...	...	...	...	...	...	...	...	...	327	45	15	387	...	...
Do. completion of maps ...	...	...	...	...	...	...	...	...	...	...	...	...	320	45	15	380	...	...
Do. area extraction ...	...	...	...	...	...	...	...	...	...	...	...	...	165	16	7	188	...	...
Do. traces	...	...	...	...	...	...	...	...	...	...	...	...	25	4	1	30	...	...
Do. khanapuri	...	...	...	...	...	...	...	...	...	...	...	...	248	37	11	296	...	...
Do. completion of records	...	...	...	...	...	...	...	...	...	...	...	...	624	94	29	747	...	...
Do. statistics	...	...	...	...	...	...	...	...	...	...	...	...	31	2	1	34	...	...
"Badar" establishment ...	...	...	...	...	1,380	242	65	1,687	...	...	...	...	1,514	227	70	1,811	...	...
	...	...	...	...	1,380	242	65	1,687	...	...	...	...	3,616	515	165	4,296	...	...
Total ...	26,605	4,793	1,295	32,693	67,803	12,008	3,190	83,001	600	90	29	719	1,03,304	18,663	4,877	1,26,844	100	16

* Inclusive of Rs. 176 for carriage of
† Ditto ,, 380 ditto

DIX II.

tion of work in each district in Bengal during season 1898-99.

ESTATES.						WARDS' ESTATES.				MISCELLANEOUS.							
DIVISION.																	
FARPUR.		CHAMPARAN TOPOGRAPHICAL.				GAYA—TIKARI WARDS' ESTATE.				CHAPRA CITY SURVEY.				DARBHANGA CITY SURVEY.			
Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.
		6				7				8				9			
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	16	1	...	17	116	17	5	138
...	...	7,894	1,284	367	9,545	...	...	...	...	1,031	150	47	1,228	1,345	212	62	1,619
...	...	7,894	1,284	367	9,545	...	...	...	...	1,047	151	47	1,245	1,461	229	67	1,757
2	60	...	...	...	...	...	...	...	...	2,240	378	105	2,723	3,368	558	157	4,083
...	...	...	...	...	...	...	...	...	...	426	64	20	510	38	3	2	43
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	37	3	2	42
2	60	...	...	...	...	...	...	...	...	2,666	442	125	3,233	3,443	564	161	4,168
2	60	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	60	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	250	38	12	300	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	250	38	12	300	...	...	...	...	...	...	...	...
4	120	7,894	1,284	367	9,545	250	38	12	300	3,713	593	172	4,478	4,904	793	228	5,925

Settlement Forms.
ditto.

APPENDIX

Statement showing the sums expended on each description of work

MISCELLANE

PATNA DIVI

Description of Work.	Revision of Babu Ganeshwar Pershad Singha's villages, Darbhanga.				Saran—Mauza Shitab Diara.				Muzaffarpur—Gobindpur (Tera Basia).			
	Actual cost.	Superintendent and Surveys' pay office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent and Surveys' pay office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent and Surveys' pay office.	Four per cent. cost of instruments.	Total.
	10				11				12			
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Demarcation	...	...	...	...	...	...	...	...	...	...	...	...
Stone embedding	...	...	...	...	...	...	...	...	...	...	...	...
Traversing	...	...	...	...	155	23	7	185	...	...	...	...
	...	...	...	...	155	23	7	185	...	...	...	...
Survey, cadastral	123	18	6	147	457	68	21	546	...	...	...	...
Completion of field maps ...	...	...	...	...	...	...	...	...	...	...	...	...
Area extraction	...	...	...	...	...	...	...	...	...	...	...	...
Traces	...	...	...	...	...	...	...	...	...	...	...	...
	123	18	6	147	457	68	21	546	...	...	...	...
Record-of-rights (khanapuri)	1,409	210	65	1,684	122	18	6	146	37	5	2	44
Completion of records	...	...	...	...	...	...	...	...	...	...	...	...
Statistics	...	...	...	...	...	...	...	...	...	...	...	...
	1,409	210	65	1,684	122	18	6	146	37	5	2	44
Arrears traversing	...	...	...	...	...	...	...	...	...	...	...	...
Do. survey, cadastral ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. completion of maps ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. area extraction ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. traces	...	...	...	...	...	...	...	...	...	...	...	...
Do. khanapuri	...	...	...	...	...	...	...	...	...	...	...	...
Do. completion of records ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. statistics	...	...	...	...	...	...	...	...	...	...	...	...
"Badar" establishment ...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	1,532	228	7	1,831	734	1 9	34	877	37	5	2	44

II—*continued.*

in each district in Bengal during season 1898-99—continued.

OUS—*contd.*

SION—*contd.*

MUZAFFARPUR—MAUZA BAZIDPUR.				PATNA—DIARA VILLAGES.				BALLIA TOPOGRAPHICAL DIARA.				PATNA GHAT FORESHORE.			
Actual cost.	Superintendent of Survey's pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Survey's pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Survey's pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Survey's pay and office.	Four per cent. cost of instruments.	Total.
13				14				15				16			
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
...	...	...	...	...	...	...	...	...	...	...	...	132	20	6	158
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
12	2	...	14	...	...	...	...	...	...	...	...	...	...	...	...
12	2	...	14	...	...	...	...	...	...	...	...	132	20	6	158
...	...	...	...	942	141	43	1,126	50	8	2	60	...	...	...	...
...	...	...	...	40	6	2	48	25	4	1	30	...	...	...	...
...	...	...	...	40	6	2	48	25	4	1	30	...	...	...	...
...	...	...	...	40	6	2	48	25	4	1	30	...	...	...	...
...	...	...	...	1,062	159	49	1,270	125	20	5	150	...	...	...	...
208	30	10	248	235	35	11	281	...	...	...	...	...	...	...	...
...	...	...	...	40	6	2	48	...	...	...	...	...	...	...	...
...	...	...	...	40	6	2	48	...	...	...	...	...	...	...	...
208	30	10	248	315	47	15	377	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
220	32	10	262	1,377	206	64	1,647	125	20	5	150	132	20	6	158

APPENDIX

Statement showing the sums expended on each descrip

Description of Work.	MISCELLANE											
	PATNA DIVI											
	Patna Topographical Diara.				Dumraon Raj—Shahabad Ballia Dispute.				Shahabad—Diara villages.			
	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.
	17				18				19			
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Demarcation	...	...	...	...	...	...	...	...	...	...	...	...
Stone embedding	...	...	...	...	...	...	...	...	...	...	...	...
Traversing	...	...	...	...	85	13	4	102	...	...	...	...
	...	...	...	...	85	13	4	102	...	...	...	...
Survey, cadastral	40	6	2	48	300	45	14	359	...	...	...	...
Completion of field maps ...	20	3	1	24	...	...	...	...	60	9	3	72
Area extraction	20	3	1	24	...	...	...	...	60	9	3	72
Traces	20	3	1	24	...	...	...	...	60	9	3	72
	100	15	5	120	300	45	14	359	180	27	9	216
Record-of-rights (khanapuri) ...	...	...	...	...	...	...	...	...	...	...	...	...
Completion of records ...	...	...	...	...	...	...	...	...	60	9	3	72
Statistics	...	...	...	...	...	...	...	...	60	9	3	72
	...	...	...	...	...	...	...	...	120	18	6	144
Arrears traversing	...	...	...	...	...	...	...	...	...	...	...	...
Do. survey, cadastral ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. completion of maps ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. area extraction ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. traces	...	...	...	...	...	...	...	...	...	...	...	...
Do. khanapuri	...	...	...	...	...	...	...	...	...	...	...	...
Do. completion of records	...	...	...	...	...	...	...	...	...	...	...	...
Do. statistics	...	...	...	...	...	...	...	...	...	...	...	...
"Badar" establishment ...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	100	15	5	120	385	58	18	461	300	45	15	360

II—*continued.*

tion of work in each district in Bengal during season 1898-99—continued.

OUS—*contd.*

SION—*concluded.*				BHAGALPUR DIVISION.											
SHAHABAD TOPOGRAPHICAL DIARA.				SHAHABAD—KACHUAR MAHAL.				BHAGALPUR—PURNEA—NEPAL BOUNDARY.				MONGHYR—BINDA DIARA.			
Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.
20				21				22				23			
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
...	...	...	...	660	99	30	789	598	90	28	716	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	40	6	2	48
...	...	...	...	660	99	30	789	598	90	28	716	40	6	2	48
75	11	3	89	...	...	...	...	...	...	...	...	...	...	...	...
50	8	2	60	...	...	...	...	...	...	...	...	...	...	...	...
30	4	1	35	...	...	...	...	...	...	...	...	...	...	...	...
45	7	2	54	...	...	...	...	...	...	...	...	...	...	...	...
200	30	8	238	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...

APPENDIX

Statement showing the sums expended on each description of work

DESCRIPTION OF WORK.	MISCELLANE											
	PATNA DIVISION—*concld.*								BENGAL			
	DARBHANGA—SAMASTIPUR MUNICIPALITY.				DARBHANGA FAIR COPIES OF RECORDS DAMAGED IN TRANSIT.				BIHAR BADARS.			
	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.
	24				25				26			
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Demarcation	...	...	...	...	...	...	...	...	...	...	...	...
Stone embedding	...	...	...	...	...	...	...	...	...	...	...	...
Traversing	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...
Survey, cadastral...	2	...	...	2	...	...	...	...	...	...	...	...
Completion of field maps ...	...	...	...	...	...	...	...	...	...	...	...	...
Area extraction	...	...	...	...	...	...	...	...	...	...	...	...
Traces	...	...	...	...	...	...	...	...	...	...	...	...
	2	...	...	2	...	...	...	...	...	...	...	...
Record-of-rights (khanapuri)...	...	...	...	...	9	1	...	10	...	...	...	...
Completion of records	...	...	...	...	...	...	...	...	...	...	...	...
Statistics	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...
Arrears traversing	...	...	...	...	...	...	...	...	...	...	...	...
Do. survey, cadastral ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. completion of maps ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. area extraction ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. traces	...	...	...	...	...	...	...	...	...	...	...	...
Do. khanapuri	...	...	...	...	...	...	...	...	...	...	...	...
Do. completion of records	...	...	...	...	...	...	...	...	...	...	...	...
Do. statistics	...	...	...	...	...	...	...	...	...	...	...	...
"Badar" establishment ...	...	...	...	...	...	...	...	...	2,285	343	...	2,628
	...	...	...	...	...	...	...	...	2,285	343	...	2,628
Total ...	2	...	...	2	9	1	...	10	2,285	343	...	2,628

II—*concluded.*

in each district in Bengal during season 1898-99—concluded.

OUS—*concluded.*																
DRAWING OFFICE.												TOTAL.				
ORISSA BADARS.				CHAKLA—ROSHNABAD BADARS.				ORISSA—KHURDA BADARS.								
Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	
27				28				29				30				
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
...	...	...	...	...	...	...	...	...	...	...	...	1,390	209	64	1,663	
...	...	...	...	...	...	...	...	...	...	...	...	3,311	511	151	3,973	
...	...	...	...	...	...	...	...	...	...	...	...	59,044	10,345	2,814	72,203	
...	...	...	...	...	...	...	...	...	...	...	...	63,745	11,065	3,029	77,839	
...	...	...	...	...	...	...	...	...	...	...	...	65,321	12,169	3,099	80,589	
...	...	...	...	...	...	...	...	...	...	...	...	1,831	253	84	2,168	
...	...	...	...	...	...	...	...	...	...	...	...	7,581	1,152	349	9,082	
...	...	...	...	...	...	...	...	...	...	...	...	2,443	327	111	2,881	
...	...	...	...	...	...	...	...	...	...	...	...	77,176	13,901	3,643	94,720	
...	...	...	...	...	...	...	...	...	...	...	...	63,098	11,558	2,987	77,643	
...	...	...	...	...	...	...	...	...	...	...	...	8,703	1,375	403	10,481	
...	...	...	...	...	...	...	...	...	...	...	...	3,656	548	168	4,372	
...	...	...	...	...	...	...	...	...	...	...	...	75,457	13,481	3,558	92,496	
...	...	...	...	...	...	...	...	...	...	...	...	612	83	28	723	
...	...	...	...	...	...	...	...	...	...	...	...	327	45	15	387	
...	...	...	...	...	...	...	...	...	...	...	...	320	45	15	380	
...	...	...	...	...	...	...	...	...	...	...	...	165	16	7	188	
...	...	...	...	...	...	...	...	...	...	...	...	25	4	1	30	
...	...	...	...	...	...	...	...	...	...	...	...	248	37	11	296	
...	...	...	...	...	...	...	...	...	...	...	...	624	94	29	747	
...	...	...	...	...	...	...	...	...	...	...	...	31	2	1	34	
899	135	...	1,034	500	75	...	575	5,658	848	...	6,506	12,236	1,870	135	14,241	
899	135	...	1,034	500	75	...	575	5,658	848	...	6,506	14,588	2,196	242	17,026	
899	135	...	1,034	500	75	...	575	5,658	848	...	6,506	2,30,966	40,643	10,472	2,82,081	

C. W. H. SYMONDS, CAPTAIN, I.S.C.,

Offg. Superintendent, Settlement-Surveys, Bengal.

APPENDIX III.

Statement showing the rate per square mile of the several processes of survey in Bengal during season 1898-99.

	PRIVATE ESTATES.						
	PATNA DIVISION.					BHAGALPUR DIVISION.	REMARKS.
	Saran.		Darbhanga	Muzaffarpur.	Champaran.	Sonthal Parganas.	
	Cadastral.	Diara topographical.	Cadastral.	Cadastral.	Topographical.	Traverse.	
1	2	3	4	5	6	7	8
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
Demarcation	...	...	...	...	...	...	(a) Rate included in traversing.
Marking station	... (a)	...	1·65	...	...	... (a)	
Traversing	36	...	32·35	...	100	45	
Cost rate Traverse ...	36	...	34	...	100	45	
Survey, cadastral	64·43	8·66	51·85	20	...	...	(b) Rate included in survey, Cadastral.
Completion of field maps ...	2·30	(b)	...	...	...	...	
Area extraction	2·97	2·17	10·35	...	...	...	
Traces	2·30	2·17	1·80	...	...	...	
Cost rate Cadastral survey ...	72	13	64	20	...	...	
Record of rights (khanapuri) ...	51·59	...	68·81	20	...	...	
Completion of Records	5·41	...	10·81	...	...	...	
Statistics	2·30	...	4·38	...	...	...	
Cost rate and records ...	59	...	84	20	...	...	
Cost rate Cadastral and records	131	13	148	40	...	...	

APPENDIX IV.

Return of Inspections of survey and khanapuri by Survey Officers and Inspectors during season 1898-99.

Number of party.	DIVISION.	District.	Inspecting Officer.	SURVEY.			KHANAPURI.				REMARKS.
				Area surveyed in square miles.	Number of villages inspected.	Number of linear miles of test survey.	Number of fields completed in khanapuri.	Number of villages inspected.	Number of entries tested.	Percentage of fields checked.	
1	2	3	4	5	6	7	8	9	10	11	12
No. 4 Party (Bihar).	Patna ...	Saran	Mr. A. W. Smart	604·92	...	1,506	1,157,451	...	...	26·9	
			,, H. H. B. Hanby ...		92	240		173	3,138		
			,, P. L. Causley ...		202	139		145	3,753		
			,, H. H. Taylor		158	115		141	2,798		
			Inspectors		1,127	1,776		1,066	301,352		
			Total ...	604·92	1,579	3,776	1,157,451	1,525	311,041	26·9	
		Darbhanga	Mr. C. S. Kraal	683·82	130	315	1,131,264	35	274	26·00	
			,, T. W. Babonau (Jr.)		173	495		85	1,658		
			,, E. G. Hardinge ...		102	387		130	2,100		
			,, A. E. LeFranc ...		118	25		103	1,584		
			,, W. H. Babonau ...		29	5		72	1,960		
			Inspectors		2,438	1,578		2,438	283,581		
			Total ...	683·82	2,990	2,715	1,131,264	2,863	291,157	26·00	
		Patna	Mr. A. W. Smart	39·94	...	83	11,238	...	...	21·2	
			Inspectors		21	79		10	2,387		
			Total ...	39·94	21	162	11,238	10	2,387	21·2	
		Shahabad	Mr. A. W. Smart	65·15	...	92	9,133	...	...	25·8	* Include partals in Dumraon Raj Ballia dispute.
			,, P. L. Causlay		7	12		...	...		
			Inspectors		26*	*93		8	2,356		
			Total ...	65·15	33	202	9,133	8	2,356	25·8	
		Saran (Chapra Municipality).	Mr. A. W. Smart	1·83	...	7	12,990	†9	...	25·9	† These figures denote number of sheets.
			,, H. H. B. Hanby ...		†6	1		†5	60		
			,, P. L. Causley		†10	3		†7	102		
			Inspectors		†40	18		†40	3,203		
			Total ...	1·83	†56	29	12,990	61	3,365	25·9	
		Saran (Revelganj Municipality.)	Inspectors	1·68	†6	3	...	...	...	...	
			Total ...	1·68	†6	3	...	...	...	...	
	Gorakhpur.	Ballia	Mr. A. W. Smart	13·08	...	25	...	...	...	...	
			Inspector		7	13	...	...	...	...	
			Total ...	13·08	7	38	...	...	...	...	

C. W. H. SYMONDS, CAPTAIN, I.S.C.,
Offg. Superintendent, Settlement-Surveys, Bengal.

APPENDIX V.

Report showing progress of 2-inch mapping in the Bengal Drawing Office during the year ending 30th September 1899.

Administrative.

THE superintendence during the year under report was under the Assistant Surveyor-General in charge of the head-quarters Drawing Office.

Maps dealt with.

II.—The cadastral maps dealt with during the year were those of Bihar, Orissa and Chittagong.

Personnel.
Mr. A. B. Smart from 1st October 1898.

Permanent Establishment.
6 Draftsmen.

Temporary Establishment.
6 Computers, writers, &c.
5 Draftsmen.

For Bihar, 1,062 cadastral maps which were received during previous years were reduced by pentagraph to the scale of 2 inches=1 mile for the completion of the standard sheets. And there were received during the year 4,778 maps, of which 1,895 were reduced by pentagraph, leaving a balance of 2,883 to be dealt with during the current year.

The reduction of 2,144 cadastral maps of Chittagong received during previous years to the scale of 2 inches=1 mile was completed during the year under report.

Publication of standard maps.

III.—The publication of the Orissa standard maps has been considerably delayed owing to numerous unsettled boundary disputes and the non-return of the proof sheets from the settlement authorities.

The outlining of 6 sheets (Statement C) was completed during the year under report.

For Bihar, 24 sheets were outlined and completed. The interior details of 32 sheets were finally examined and forwarded to the Photograph Office for reduction to the scale of 1 inch=1 mile. The outlining and completing of 32 sheets has yet to be dealt with.

The publication of 60 sheets of Chittagong was taken in hand during the year under report, all of which have been projected and plotted, and the outlining of 16 sheets completed.

IV.—Of the special publication of 26 standard sheets of Oirssa on the scale of 2 inches=1 mile called for by the Government of Bengal, showing the irrigated area, 9 sheets were published during the year under report.

"Badars."

V.—From four districts of Bihar, viz., Muzaffarpur, Saran, Champaran and Darbhanga the badars of 1,330 villages were received during the year under report, of which 997 were corrected and disposed of. The total number of Bihar villages the badars of which were disposed of reached 1,477, of which 147 including Badars of 34 villages of the three districts, Noakhali, Midnapore and Chittagong, were received during previous years, leaving a balance of 480 villages to be dealt with during the current year.

The Badar Establishment attached to the Bengal Drawing Office was increased by 46 estimators from the beginning of the current financial year to correct the cadastral maps of the three districts of Orissa, viz., Balasore, Cuttack and Puri, in accordance with the settlement traces. The badar traces and fraction lists of 9,906 villages of these three districts were received during the year under report from the Settlement Officer, of which the maps of 2,901 villages have been corrected, leaving a balance of 7,607 villages to be dealt with during the current year.

A. E. SPRING,
Assistant Surveyor-General,
in charge Bengal Drawing Office.

APPENDIX V.

A.

Statement showing Orissa Badar work done during the year ending 30th September 1899.

	Orissa.				
	Cuttack.	Khurda.	Puri.	Balasore.	Total.
1	2	3	4	5	6
Balance in hand on 1st October 1898 ...	...	...	...	602	602
Received during the year	4,520	1,294	1,963	2,129	9,906
Total ...	4,520	1,294	1,963	2,731	10,508
Corrected during the year	1,801	900	200	...	2,901
Balance in hand ...	2,719	394	1,763	2,731	7,607

B.

Statement showing Badar work done during the year ending 30th September 1899.

	Bihar.				Bengal.			Total.	Remarks.
	Muzaffarpur.	Saran.	Champaran.	Darbhanga.	Noakhali.	Midnapore.	Chittagong.		
1	2	3	4	5	6	7	8	9	10
Balance on 1st October 1898	33	20	41	19	11	21	2	147	
Received during the year	120	666	37	507	...	...	...	1,330	
Total ...	153	686	78	526	11	21	2	1,477	
Corrected ditto	150	420	74	321	11	21	...	997	
Balance in hand	3	266	4	205	...	...	2	480	

C.

Statement showing progress of 2-inch mapping during 1898-99.

Province.	Total number of sheets.	Graticules projected.	Stations plotted.	Details reduced by pantagraph and transferred to 2-inch sheets.	Number of villages, streams, &c., typed.	Outlining completed.	Foot-notes, margins, &c., completed.	Examined.	Finally examined.	Sent to Photo Office for reduction to 1-inch scale.	Proofs examined.	Final press order given.
1	2	3	4	5	6	7	8	9	10	11	12	13
Orissa.												
Previously reported	124	124	124	124	124	118	114	114	114	88	88	12
Completed during the year, including Khurda	...	...	...	...	...	6	10	10	...	16	16	...
Total ...	124	124	124	124	124	124	124	124	114	104	104	12
Bihar.												
Previously reported	124	118	118	104	92	68	40	56	16	16	...	...
Completed during the year	...	6	...	...	8	24	...	...	32	32	16	...
Total to 30th September 1898 ...	124	124	118	104	100	92	40	56	48	48	16	...
Chittagong.												
Previously reported	...	...	...	...	...	...	...	...	...	...	...	...
Completed during the year	60	60	60	48	...	16	...	...	...	...	...	...
Total ...	60	60	60	48	...	16	...	...	...	...	...	...

D.

Statement showing maps on scale 2″=1 mile prepared by order of the Under-Secretary to the Government of Bengal in the Irrigation Department in his letter No. 853I., dated 31st July 1893.

Serial number.	Sheet number.	Sections.	Final press order given.	Remarks.
1	2	3	4	5
1	165S.E.	1	1	
2	166N.E.	1	...	
3	192S.E.	1	...	
4	193	4	2	
5	194	4	...	
6	195	4	...	
7	196	4	...	
8	220S.W.	1	...	
9	221N.W.S.W.	2	2	
10	222N.W S.W.	2	2	
11	223N.W.S.W.	2	2	
	Total ...	26	9	

E.

Statement showing cadastral maps received, pentagraphed and remaining to be pentagraphed to 2″ = 1 mile scale during survey year 1898-99.

Province.	Number of maps received during year ending 30th September 1899.	Number of maps reduced by pentagraph.	Remaining for reduction.	Remarks.
1	2	3	4	5
Orissa ...	...	...	...	
Bihar ...	4,778	(a)1,062 1,895	2,883	(a) Received during previous years, but reduction made during year under report.
Chittagong ...	...	2,144	...	

C. W. H. SYMONDS, Captain, s.c.,
Offg. Superintendent, Settlement-Surveys, Bengal.

J. B. K. & others.—Reg. No. 5555J—425—8-1-1900.

No. 192A.

FROM R. W. CARLYLE, ESQ., C.I.E.,

Offg. Secretary to the Board of Revenue, L. P.,

TO THE SECRETARY TO THE GOVERNMENT OF BENGAL,

REVENUE DEPARTMENT.

Dated Calcutta, the 19th February 1900.

LAND REVENUE.
(Surveys and Settlements.)

SIR,

I AM directed to submit herewith the reports of the Superintendent of Settlement-Surveys and of the Director of the Department of Land Records and Agriculture, Bengal, for the survey and settlement year ending on the 30th September 1899. They were both due to the Board on the 15th December, but the latter was not received till the 19th January 1900.

THE HON'BLE MR. G. TOYNBEE.

The Director states that his report was in manuscript by the 22nd December but was not printed till the 18th January, owing to heavy pressure of work in the Secretariat Press. Both reports form a record of excellent work done during the year, and reflect the highest credit on the above officers and on their subordinates.

2. Captain R. T. Crichton, I.S.C., was in administrative charge of the survey operations from the 1st October 1898 to the 26th April 1899, and Captain C. W. H. Symonds, I.S.C., for the rest of the year. The office of the Director of the Department of Land Records and Agriculture, Bengal, was held by Mr. P. C. Lyon throughout the year. It is not reported how long Captain Crichton was on tour, but Captain Symonds was out on tour for 16 days during his acting incumbency between 26th April and 30th September 1899. Mr. Lyon spent 159 days on tour, as against 147 days in the previous year, and did much useful work during that period.

Charge and inspection.

3. The Survey and the Settlement Departments continued generally to work together harmoniously. There was, however, some friction between the *khanapuri* kanungos and the officers of the Survey Department in Saran. It is reported that rules have now been drawn up to regulate the relations between these two sets of officers, which will, it is hoped, obviate such friction in future.

Co-operation of the two Departments.

4. The Superintendent of Settlement-Surveys' report shows that his programme was fully carried out, except in the districts of Backergunge and Burdwan. The commencement of the Backergunge operations was deferred to the season 1900-1901, while the proposal to prepare a map, after professional survey of pargana Shergarh in Burdwan, belonging to the Pachete Encumbered Estate, was ultimately dropped. During the survey year under review an area of 1,727 square miles was traversed, 217 square miles were topographically surveyed, and 1,298 square miles were cadastrally surveyed. Record-writing was also completed for 1,321 square miles. The cadastral outturn includes, however, the revision survey of a village in Muzaffarpur and the city surveys of the Darbhanga and Chapra Municipalities. The survey of the entire district of Saran, containing 2,620 square miles in all, (of which 2,510 square miles were cadastrally and 110 topographically surveyed), was completed during the season under review. The total cost incurred is shown to be Rs. 2,82,081, but this includes some arrear payments and many items the expenditure on which was met by private parties.

Programme and outturn.

5. The subjoined table shows the rates of cost per square mile of surveys in different districts :—

Cost-rates.

Division.	District.	Traverse survey.	Topographical survey.	Cadastral survey.	Record-writing.
1	2	3	4	5	6
		Rs.	Rs.	Rs.	Rs.
Patna ...	Saran	36	13	72	59
	Champaran ...	100		...	...
	Muzaffarpur	...	...	20	20
	Darbhanga ...	34	...	64	84
Bhagalpur ...	Sonthal Parganas ...	45	...	...	...

The differences are somewhat striking. The Superintendent of Settlement-Surveys states that the rates for cadastral survey and record-writing in Saran might have been less by about Rs. 11 per square mile, had labour been supplied free. The rate of coolie labour in Darbhanga was also about Rs. 11 per square mile. The high rate in Champaran appears to be due to the small area completed, owing to the health of the establishment having broken down, and also to the traverse cost having been included in the total cost. These figures are not, however, really comparable without details as to the adjustment of charges for control, &c.

6. A new procedure—suggested by Mr. Babonau and for which he is entitled to great credit—was tentatively adopted in North Bihar to secure the better attendance of raiyats and zamindars. The amin was supplied with a printed notice form containing columns for the names of parties whose attendance was necessary for either survey or *khanapuri*. Their signatures were obtained in these against the fields in which they possessed interests. It is stated that the reports for non-attendance were, in consequence, reduced to one-ninth. This procedure will, the Superintendent of Settlement-Surveys reports, be adopted in all future Bengal surveys. To prevent the suppression by zamindars of the names and rights of raiyats in order to have their lands recorded as being in the cultivating possession of the landlord himself—a mode of oppression resorted to by some large zamindars in North Bihar—Inspectors were ordered to have all fields within blocks surrounded by main *ails* or boundaries separately mapped in cases in which zamindars claimed as *khudkasht* blocks of paddy suspected to be cultivated by raiyats.

Improvement in procedure.

7. The successful result of the new arrangement mentioned above to secure the attendance of raiyats and zamindars goes far to show that the previous non-attendance of parties was frequently due to ignorance, &c., rather than to wilful negligence; and that their attitude on the introduction of the new notice form was consistent with their eagerness to obtain their *parcha* slips and evinced the keen interest they are said to have taken in the work, both in Saran and Darbhanga, especially at the *khanapuri* stage. Considerable obstruction was, however, experienced from the inhabitants of tappa Manihari in the Sonthal Parganas who uprooted theodolite stations and had in some cases to be punished.

Attitude of the people.

8. A satisfactory feature of the work in Saran and Darbhanga is that a large number of interior disputes is now being decided by the cheap agency of *khanapuri* kanungos. Paragraph 43 of the Director of Land Records' report appears to show that the work turned out by them was good, at least in Darbhanga. His attention will, however, be invited to the remarks of the Superintendent of Settlement-Surveys on their work at pages 12 and 17 of his report.

Decision of interior disputes.

9. A full report was submitted to Government in the Board's letter No. 554A, dated 12th June 1899, on the subject of the relaying of the disputed boundary between the Kachnar and Banskati mahals in Shahabad.

Boundary dispute between Kachnar and Banskati mahals, Shahabad.

Surveys not under the Board's control.

10. Paragraphs 41 and 55 to 57 of the Survey Report do not affect the Board.

Survey programme for survey year 1899-1900.

11. Owing to the inability of the Government of India to supply funds, and to the postponement of the Backergunge work to the season 1900-1901, the programme for the Bengal surveys during 1899-1900, shown in paragraph 58, has since been revised.

Settlement outturn and cost.

12. Paragraph 2 of the Director's report shows that the following progress was made, and expenditure incurred, in settlements under his control during the survey year 1898-99:—

Area under settlement of revenue or record-of-rights.	Area for which *khanapuri* completed during 1898-99.	Area for which records were attested and existing rents recorded in 1898-99.	Number of tenants whose rents were settled during 1898-99.	Number of villages for which final records were published in 1898-99	Expenditure of the Settlement Department during 1898-99.
1	2	3	4	5	6
Square miles.	Square miles.	Square miles.			Rs.
21,803	1,768	1,639	73,487	4,956	8,72,718

Expenditure—Provincial, Imperial and from deposits.

13. Out of the total expenditure of Rs. 8,72,718, Rs. 3,42,631 represents the Provincial cost incurred for the settlement of temporarily-settled tracts and Government estates. Rs. 3,52,872 that advanced by the Imperial Government for the North Bihar settlement, and Rs. 1,77,215 the expenditure apparently incurred from deposits.

Work completed.

14. During the year under review the assessment operations in Orissa and the winding-up of the Chittagong settlement were practically completed. The settlement operations in the Khurda Government estate in Puri, and in the Chakla Roshnabad and Palpara and Gangamandal private estates in Tippera, were also brought to a close. Record-writing was also finished in the district of Saran.

15. The following statement shows the progress in the preparation and disposal of final reports :—

Temporarily-settled tracts and Government Estates.

	Final report.	Progress.
1.	Orissa	Being printed. Expected by the end of February.
2.	Khurda Government estate, Puri ...	Received. Commissioner's remarks awaited.
3.	Chittagong	Not yet submitted by Mr. Allen.
4.	Chars Lakhi, Badu, &c., Noakhali ...	Disposed of in Board's letter to Government, No. 540A, dated 8th June 1899, and Government Resolution No. 2716, dated the 11th August 1899.
5.	Heshamuddin, Backergunge	Disposed of in Board's letter to Director of Land Records, No. 109A, dated the 10th April 1899.
6.	Tushkhali, Backergunge ...	Disposed of in Board's No. 718A, dated 22nd July 1899, to Government, and Government Resolution No. 959T.—R., dated 11th November 1899.
7.	Darjeeling Terai ...	Disposed of in Government Resolution No. 2075, dated 20th May 1899.
8.	Palamau Government estate	Disposed of in Board's letter to Government, No. 288A, dated the 30th March 1899, and Government Resolution No. 2423, dated the 20th July 1899.
9.	Jaipur estates, Bogra ...	Disposed of in Board's letter No. 423A, dated 9th May 1899, to Government, and Government Resolution No. 2712, dated 10th August 1899.
10.	Patashpur estates, Midnapore	Disposed of in Board's letter No. 1051A, dated the 9th October 1899.

Permanently-settled tracts and Private Estates.

	Final report.	Progress.
11.	Muzaffarpur	Being printed.
12.	Champaran	Ditto.
13.	Chakla Roshnabad, Tippera and Noakhali ...	Advance copy received. Director of Land Records report is awaited.
14.	Palpara estate, Tippera ...	Disposed of in Board's letter No. 378A, dated the 28th November 1899, to Director of Land Records.
15.	Gangamandal estate, Tippera	Not yet submitted.
16.	Tantibunia estate, Khulna (temporarily-settled Sundarbans estates).	Disposed of in the Board's letter to Director of Land Records, No. 316A, dated 3rd October 1899.
17.	Narhan ward's estate, Monghyr	Disposed of in Board's letter No. 65W., dated 1st August 1899, to Government, and in Government Resolution No. 3222, dated 11th September 1899.
18.	Tikari ward's estate, Gaya Government estatse, and Balkhara mahal in Gaya	Disposed of in Board's letter 1145A, dated 13th November 1899, to Government.

Increases of revenue obtained.

16. The results of the assessment of Government revenue in temporarily-settled estates and Government estates up to the end of the year, as far as can be gathered from the report, are as follows :—

	Total number of estates.	Number of estates assessed.	Previous revenue.	New revenue.	Increase.	Increase per cent.	Remarks.
1	2	3	4	5	6	7	8
			Rs.	Rs.	Rs.		
Orissa	6,355 Villages.	6,350* Villages.	13,82,104 Rental.	20,99,627 Rental.	7,17,523	52	*The remaining five estates —killas— have been recommended for special treatment, *vide* Board's letter to Government No. 1319A, dated the 15th December 1899.
Noakhali Government estates	14 sq. m.	11	14,882	21,310	6,428	43	
Backergunge ditto ...	103 Villages.	... Villages	1,34,794	1,59,663	24,869	18	
Sundarbans ditto ...	25	20	71,007	74,549	3,542	5	

Orissa.

17. The work of assessment of revenue has been completed and the new revenue has been brought into force in Orissa, subject to such modifications as may be subsequently made by the higher Revenue authorities. The fact that out of 6,355 estates only six are recusant speaks volumes for the tact and consideration which have characterised the proceedings of the Settlement Officer. None of the assessment reports are now pending with the Board. The question of the winding-up of the Orissa settlement work is being dealt with in a separate report. The transfer of the records to the Collectorates and the taking of *kabuliyats* will soon be completed. The work remaining to be done in the permanently-settled areas in Cuttack of (i killa Darpan and (ii) killa Aul, the latter of which includes (*a*) pargana Derabisi and (*b*) parganas Aul and Utihar, has been reported on in the correspondence ending with Board's letter No. 86A, dated 24th January 1900. The further information called for by Government on the question of the imposition of a patwari cess and a scheme for the maintenance of the records in Orissa has been partly supplied by the Director; his supplementary report is now awaited by the Board.

Chittagong.

18. Some work still remains to be done in copying and classifying pending records. This is expected to be completed by the end of March 1900. The work of realising a share of the cost of the survey and settlement operations from the zamindars and tenants in the permanently-settled area will, however, continue. On the

subject of the maintenance of the records of this settlement, a report has been submitted to Government in the Board's letter No. 1297A, dated 13th December 1899.

Government estates in Noakhali, Backergunge, Faridpur and Sundarbans.

19. The work done in the Government estates in the districts of Noakhali, Backergunge, Faridpur and Sundarbans was, on the whole, satisfactory, and calls for no special remarks.

North Bihar.

20. In Muzaffarpur and Champaran the only work that remains is the recovery of costs now going on under the supervision of the Collectors. The operations conducted in Saran and Darbhanga made good progress during the year. The *khanapuri* kanungos, as noticed above, contributed greatly to the speedy and satisfactory decision of a large number of disputes in those districts. The recovery work has also, it is reported, been very well managed in Saran, while in Darbhanga it has been organised and has commenced since the close of the year. The settlement of fair rents has resulted in a comparatively small increase in both districts, viz., 8·58 per cent. in Saran and 7·80 per cent. in Darbhanga (both under section 52 of the Bengal Tenancy Act) on the ground of excess area. The number of applications for the settlement of fair rents has been very small. The question of the maintenance of records in North Bihar was dealt with in the Board's letter to Government, No. 975A, dated 21st September 1899, in which they expressed the opinion that all attempts to keep the records up annually, or at short intervals, should be abandoned, and that recourse should be had to periodical revisions.

Useful reforms.

21. In addition to the changes due to the introduction of the Bengal Tenancy Amendment Act, III (B.C.) of 1898, on which the North Bihar Settlement Officer's remarks in Appendix IV are worth noticing, several useful reforms were introduced in North Bihar, as indicated in paragraph 5 of Mr. Kerr's letter to the Director in the above appendix. The Board's orders regarding the treatment of *chit arazis* (or scattered portions of main estates in one village actually lying in another village but included in the former in disregard of geographical situation) have been conveyed to the Director in their letter No. 432A, dated 30th December 1899. It has been decided that the *chit arazis* should be eliminated from the settlement records in future and included within the records of the village within which they geographically lie. As regards the proposal to adopt a special ink for writing the Collectorate copy of the record-of-rights, referred to in paragraph 7 of the Appendix and in paragraph 10 of the body of the Director's report, the Government orders approving the suggestion conveyed in its No. 143Mis., dated 6th January 1900, have been communicated to the Director and the Superintendent of Stationery, Calcutta.

Transfers of occupancy holdings.

22. As regards the transfer of occupancy rights, it appears that out of holdings attested during the year 19 per cent. have been effected by sales or mortgages in Saran and only 4 per cent. in Darbhanga. Of the same holdings, only 13·8 per cent. went to the money-lending classes in Saran and 11 per cent. in Darbhanga.

Recovery of costs.

23. The result of the recovery of costs in North Bihar is shown in the subjoined table:—

District.	Total demand.	Recoveries.		Balance.	Remarks.
		This year.	Total.		
1	2	3	4	5	6
	Rs.	Rs.	Rs.	Rs.	
Muzaffarpur	7,64,633	2,62,036	7,45,705	18,928	
Champaran	7,85,382	1,74,492	5,46,131	2,39,251	
	Total computed demand.				
Saran	2,03,245	1,86,661*	1,86,661	16,584	* Cost of recovery 4·77 per cent.
Darbhanga	Work commenced since the close of the year.				

Chakla Roshnabad.

24. Settlement work in Chakla Roshnabad was at last brought to a close during the year under review under the able supervision of Mr. Cumming. An increase in rental to the amount of Rs. 90,206, of which Rs. 31,781 has been obtained from tenure-holders, and Rs. 58,425 from khas raiyats, has been secured to the Hill Tippera Raj. The whole of the raiyati increase will be payable from April next, but in the case of the tenure-holders the full increase will not be obtained until after some years, as progressive enhancements have been sanctioned in many instances. The recovery work was started in August 1898, and up to the end of September 1899, out of the total computed demand of Rs. 3,19,245, which is exclusive of the proprietor's share of the cost, Rs. 2,29,501 was collected at a cost of 6·3 per cent. on the sum collected. To enable the Raj to meet settlement expenditure the Government has given a loan of two lakhs, and it is understood that the Raj will soon be in a position to repay this sum with interest.

Palpara and Gangamandal private estates, Tippera, and Backergunge private estates.

25. The work in the Palpara and Gangamandal estates in Tippera has been completed, and the progress in the Backergunge private estates was good.

Settlement not under the Board's control.

26. The Board are not concerned with paragraphs 56 to 61 of the Director's report.

New settlements to be taken up.

27. With reference to the new undertakings enumerated in paragraph 5 of the report, it is to be noted that the inception of the operations in the Porahat private estate in Singhbhum has since been sanctioned by the Government of India.

Revision of Survey and Settlement Manual and Board's instructions under revised Bengal Tenancy Act Rules.

28. Under orders conveyed in Government order No. 4349L.R., dated 6th December 1899, the revision of the Survey and Settlement Manual, 1895, and the preparation of the Board's instructions on the revised Government rules under the Bengal Tenancy Act, mentioned in paragraph 6 of the report, are to be referred to a Conference of officers to be held in Calcutta in the first week of March next.

Utilisation of maps and records by Opium Department.

29. On the subject of the utilisation of the maps and records prepared in the survey and settlement operations in North Bihar by the subordinate officers of the Opium Department the Board are awaiting the Bihar Agent's report.

Training of junior Civilians.

30. It is satisfactory to observe (*vide* paragraph 20 of Survey Report and paragraph 11 of the Settlement Report) that junior Civilians are now being systematically trained in survey and settlement work under the rules approved by Government.

Merits of officers.

31. The Board fully agree with Mr. Lyon in the high praise bestowed on Messrs. S. L. Maddox, J. G. Cumming, J. H. Kerr, H. McPherson, and C. J. Stevenson-Moore, and they also concur generally with his remarks on the merits of the other officers mentioned in paragraph 63 of his report.

32. The Board notice with pleasure the special interest taken in the settlement work in their districts by Messrs. R. Carstairs, W. C. Macpherson and J. H. Lea and the assistance rendered generally by indigo-planters. They desire to thank Captains R. T. Crichton and C. W. H. Symonds for the valuable assistance they have rendered to the Settlement Department at all times, and Mr. J. M. Chalmers, Superintendent of the Government Press, for the excellent work done by him for that Department. Mr. Lyon is, in the Board's opinion, entitled to the highest commendation for the very efficient manner in which he administered the Settlement Department during the past year.

I have the honour to be,

SIR,

Your most obedient servant,

R. W. CARLYLE,

Offg. Secretary.

No. 62A.

COPY forwarded to the Director of the Department of Land Records and Agriculture, Bengal, with reference to his No. 104S, dated the 9th January 1900, for information. His special attention is invited to paragraph 8 above.

By order of the Board of Revenue, L. P.,

R. W. CARLYLE,

Offg. Secretary.

CALCUTTA,
The 19th February 1900.

No. 9A.

COPY forwarded to the Superintendent of Settlement-Surveys, Bengal, with reference to his No. $\frac{3053}{R-7-59}$, dated the 30th November 1899, for information.

By order of the Board of Revenue, L. P.,

R. W. CARLYLE,.

Offg. Secretary.

CALCUTTA,
The 19th February 1900.

C. A. P.—Reg. No. 5555J—425—22.2.1900.

REVENUE DEPARTMENT.

LAND REVENUE.

DARJEELING, THE 26TH MAY 1900.

RESOLUTION—No. 581T.—R.

READ—

Letter No. 192A., dated the 19th February 1900, from the Board of Revenue, Lower Provinces, submitting the Report of the Superintendent of Settlement-Surveys on surveys, and of the Director of Land Records on the settlements, in Bengal, for the year ending 30th September 1899.

The reports.

THE report of the Director of Land Records was received by the Board on the 19th January, and the joint reports were submitted to Government with the Board's review on the 22nd February 1900.

Charge and inspection.

2. Captain R. T. Crichton was in charge of the survey operations up to the 26th April 1899, when he went on furlough, and was succeeded by Captain C. W. H. Symonds. Mr. P. C. Lyon held the office of Director of Land Records throughout the year. It is not reported what time Captain Crichton spent on tour; his successor was out for 16 days between the 26th April and the 30th September 1899. Mr. Lyon spent 159 days on tour, compared with 147 days in the previous year.

Outturn and cost.

3. The following table shows the general outturn and cost of survey and settlement work in the past and three previous years:—

YEAR.	Traverse survey.	Skeleton boundary survey.	Topographical survey.	Cadastral survey.	Record-writing.	Cost of survey.	Cost of settlement.	Total cost.
1	2	3	4	5	6	7	8	9
	Sq. miles.	Sq. miles.	Sq. miles.	Sq. miles.	Sq. miles.	Rs.	Rs.	Rs.
1895-96	2,131	187	.....	2,429	2,429	4,29,091	10,00,017	14,29,108
1896-97	908	.....	410	845	845	2,20,142	11,45,019	13,65,161
1897-98	661	.....	35	1,302	1,302	2,73,994	9,66,924	12,40,918
1898-99	1,727	... ..	217*	1,298	1,321	2,82,081	8,72,718	11,54,799

NOTE.—The figures given above as to cadastral survey and record-writing in 1897-98 include 2 square miles of city survey in the Samastipur Municipality, and those for 1898-99 include 6 square miles of similar work in the Darbhanga and Chapra Municipalities.
* Includes 95 square miles on the 2 inches = 1 mile scale in the north-west corner of Champaran.

During the year under report the survey programme laid down was exceeded except in respect of topographical survey.

Cost-rates, traverse and topographical survey.

4. The cost-rates of the more important traverse and topographical surveys were as follows:—

Division.	District.	Traverse survey.	Topographical survey.
		Rs.	Rs.
Patna ...	Saran ...	36	13†
	Champaran ...	100	
	Darbhanga ...	34	...
Bhagalpur ...	Sonthal Parganas ...	45	...

† Of 56·83 square miles on the 16 inches to the mile scale in the Gogra, Ganges, and Gandak *diaras*.

Of these, the operations in Champaran consisted of the traverse and topographical survey of an area of 95 square miles in North Champaran, and the high rate of cost appears to be due to the small area dealt with and the unhealthiness of the climate.

In 1897-98 the cost of the traverse survey in Saran was Rs. 108·04 per square mile, but the area traversed was small, being only 51 square miles, as compared with 264 square miles in 1898-99, and, as the traverse section was employed in Saran at the commencement of the season, the cost of the move from the recess quarters and the pay of the establishment for October 1897 went to swell the cost of the operations in the season of 1897-98. The cost-rate of traverse survey in the Sonthal Parganas has been high, owing partly to the nature of the country, which is to a great extent covered with low-lying hills and ravines, with no actual village sites but hamlets scattered over the high lands, and to the fact that in Tappa Manihari the progress of the work was delayed considerably by the wanton destruction of the theodolite stations.

Cost-rates, cadastral survey, and record-writing.

5. The largest areas cadastrally surveyed were in the districts of Saran and Darbhanga, and while they were about equal to the areas dealt with in those districts in the previous year, the cost-rates, as shown in the table below, were on the whole substantially less than in 1897-98 :—

District.	Areas dealt with.		Cost-rate.					
			Cadastral survey.		Record-writing.		Total.	
	1897-98.	1898-99.	1897-98.	1898-99.	1897-98.	1898-99.	1897-98.	1898-99.
1	2	3	4	5	6	7	8	9
	Sq. m.	Sq. m.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Saran ...	555	548	85·89	72	104·29	59	190·18	131
Darbhanga	733	684	74·86	64	78·32	84	153·18	148

In both seasons the average size of the field in Saran was the same, viz., ·3 of an acre. In Darbhanga the average size of the field was ·42 in 1897-98, while in 1898-99 it was ·38 of an acre. Including the municipal areas surveyed, the total area cadastrally surveyed in the year under report was 1,298 square miles, and the total cost of cadastral survey and record-writing was Rs. 2,02,292, giving an average cost rate of Rs. 156 per square mile. The corresponding cost-rate in 1897-98 worked out to Rs. 182 per square mile. The great divergence in the cost of record-writing in Saran and in Darbhanga deserves some explanation.

Changes in procedure, and attitude of the people.

6. No material alteration was made in the general procedure during the year under report. As regards minor details, it is reported that a new form of notice was introduced tentatively in North Bihar at the instance of Mr. T. W. Babonau, Sub-Assistant Superintendent of Survey, in order to improve the attendance of landlords and raiyats. It was appreciated by both raiyats and

zamindars and reduced very considerably the number of those who did not attend. The Lieutenant-Governor agrees with the Board in thinking that the success of this arrangement, which should, as proposed, be adopted in all Bengal surveys in future, goes to show that the previous non-attendance of parties was frequently due to ignorance, rather than to wilful negligence; and that their attitude on the introduction of the new notice form was consistent with their eagerness to obtain their *parcha* slips and evinced the keen interest they are said to have taken in the work, both in Saran and Darbhanga, especially at the *khanapuri* stage.

It was frequently found that the zamindars attempted to have lands really cultivated by raiyats recorded as in their own cultivating possession. When there was reason to suspect that this was being done, Inspectors were ordered to have separately mapped all fields within blocks surrounded by main *ails* or boundaries in cases in which zamindars claimed the blocks as *khudkasht*. With the exception of the villages belonging to the Darbhanga Raj, it was found that several zamindars in the district of Darbhanga prevented their raiyats from coming forward to point out their lands which they then claimed should be entered as *zirat*. After the passing of the order above referred to and the imposition of a fine of Rs. 500 on one zamindar, little or no trouble was experienced.

Settlement of minor disputes by kanungos during *khanapuri*.

7. The system of having minor disputes settled by kanungos in the course of record-writing, which was introduced in 1897-98, was continued during the year under report. There were three kanungos with the survey camp in Saran and four with that in Darbhanga, who settled most of the very numerous interior disputes that arose during *khanapuri*. With a view to render more efficient the working of these kanungos with the survey establishment, certain rules have recently been framed by the Settlement Officer of North Bihar defining the powers of the former and their relations with the latter establishment, which, it is hoped, will prove of much benefit. The following extract is taken from the Settlement Officer's report on the operations in the district of Darbhanga:—

"With a view to testing the value and accuracy of the decision of internal disputes by khanapuri kanungos, a note of the orders objected to and revised at attestation was kept in each attestation camp. The figures are not given in tabular form, as the return was not prescribed until the middle of the season, and was not kept in a uniform manner by all the camps, but the following abstract has been carefully compiled and may be accepted as approximately accurate:—Out of 41,536 orders passed by khanapuri kanungos, only 3,982, or 9 per cent., were objected to at attestation; 2,252, or 5 per cent., were altered by the attestation officer, 1,902 as wrong in points of fact or law, and 350 on technical grounds. These results are, I think, highly satisfactory. It may at first sight appear somewhat remarkable that 56 per cent. of the orders objected to should require revision, but it must be remembered that they form only a very small proportion of the total number of orders passed, and that most of them were difficult cases in which there was large room for difference of opinion. All the cases in which the attestation officer thought it necessary to reverse the kanungo's decision were under the rules referred to me as Assistant Settlement Officer in charge for final orders, and in no case did I find that a kanungo was seriously to blame for a wrong decision, or that he had not some grounds for the conclusion at which he had arrived. The truth is that a very large number of the internal disputes filed at khanapuri, where there is nothing to pay, are of a frivolous character, and will never reappear if they are decided promptly on the spot. We want a cheap agency to decide these cases, and this, I think, we have found in the institution of khanapuri kanungos. The more important disputes will of course crop up again at attestation and under section 103A, and it is not surprising that an attestation officer who can examine documentary evidence in his court at his leisure should often, in important and difficult cases, find it necessary to differ with the khanapuri kanungo, who passes orders summarily while standing in the field, though the latter method is no doubt the most suitable for deciding petty disputes of a comparatively unimportant nature. I am confident that as our kanungos gain more experience, it will be found that the proportion of their decisions which require revision at attestation will diminish, and this return which I propose to have kept this year in an amplified form will form a useful check on the work of each officer."

The opinion of the Survey Officers was, however, scarcely so satisfactory. It is very probable that with added experience these officers will improve.

8. The progress of the survey in each district in North Bihar is shown in the table below:—

Bihar survey.

		Traverse Survey.		Cadastral Survey.		Record-writing.		Total cost of cadastral survey and record-writing.	Cost rate per square mile.			Cost of traverse and cadastral survey and record-writing per acre.	Expenditure on settlement.
		Area in square miles.	Cost.	Number of villages.	Area in square miles.	Number of villages.	Area in square miles.		Traverse survey.	Cadastral survey and record-writing (approximate).	Total cost (approximate).		
1		2	3	4	5	6	7	8	9	10	11	12	13
			Rs.					Rs.	Rs.	Rs.	Rs.	As.	Rs.
Muzaffarpur.	1891-92	1,247	43,290	.....	.....	.....	.....	.....	34·7	.....	.....	.....	.....
	1892-93	997	38,515	1,153	529	1,052	446	76,413	38·6	152·1	190·7	Nearly 5	34,301
	1893-94	Nil.	6,805	1,594	979	1,365	788	1,27,045	.....	146·3	.....	Over 3½	58,679
	1894-95. Original work ...	.....	2,840	664	658	987	938	1,19,078	.....	139·3	.....	Nearly 3½	
	1894-95. Revision of Colonel Barron's survey.	.....	.....	650	410	650	410	45,765	.....	128·8	.....	Over 3	1,28,342
	1894-95. Revision survey of Raj Darbhanga villages.	.....	.....	8	14	5	7	580	.....	73	.....	Nearly 2	
	1895-96. Original work ...	20	991	433	452	433	452	79,690	32·58	172·31	254·89	Over 6	
	1895-96. Revision of maps and records of 1892-93.	.....	.....	9	7	9	7	503	.....	72·37	.....	Nearly 2	1,80,05.
	1895-96. Revision of maps and records of 1878-79.	.....	.....	3	7	3	7	1,074	.....	157·00	.....	Nearly 4	
	1896-97	2	401	2	2	2	2	3,961	.....	.....	.....	.....	1,19,174
	1897-98	10	1,094	5	2	5	2	247	109·4	123·5	232·9	Nearly 6	86,251
	1898-99	.....	.....	(3 portions)	3	3 (portions)	3	120	.....	·40	.....	.....	38,353
Champaran.	1891-92 ...	363	12,601	.....	.....	.....	.....	.....	34·7	.....	.....	.....	.....
	1892-93 ...	1,103	30,654	244	416	234	320	41,182	27·8	109·1	136·9	Nearly 3½	21,800
	1893-94 ...	1,320	50,498	325	517	354	599	71,494	38·3	129·2	167·5	Over 4	(b)70,144
	1894-95 ...	126	8,205	1,038	1,162	1,058	1,176	1,56,858	65·2	134	199·2	Nearly 5	57,670
	1895-96 ...	386	9,272	1,047	1,185	1,047	1,185	1,23,109	24·02	103·88	127·90	Over 3	1,21,102
	1896-97 ...	... ...	216	.....	.....	.....	.....	3,098	.....	.....	.....	.....	87,860
	1897-98 ...	.....	103	.....	.....	.....	.....	.....	.....	.....	.....	.....	79,703
	1898-99 ...	(a)95	(a)9,545	.....	.....	.....	.....	.....	(a)100	.....	.....	.....	28,662
Saran ...	1892-93 ...	894	34,527	.....	.....	.....	.....	2,366	38·6	.....	.....	.....	.....
	1893-94 ...	932	34,273	1,260	549	1,229	527	65,200	36·8	119·2	156	Nearly 4	.....
	1894-95 ...	516	15,258	.....	.....	.....	.....	10,287	29·5	.....	.....	.....	36,460
	1895-96 ...	52	3,304	1,204	(c)645	1,234	669	93,548	56·00	147·17	203·17	Over 5	62,135
	1896-97 ...	60	5,359	330	210	330	210	56,837	89·31	270·65	359·96	Nearly 9	88,135
	1897-98 ...	51	6,941	877	555	877	555	1,05,799	136·09	190·6	326·69	8	1,04,676
	1898-99 ...	264	9,574	1,066	548	1,066	548	71,740	36	131	167	Over 4	1,45,164
Darbhanga.	1893-94 ...	518	16,340	.....	.....	.....	.....	.....	31·6	.....	.....	.....	.....
	1894-95 ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1895-96 ...	1,179	27,344	14	16	14	16	1,678	23·20	103·37	126·57	Over 3	Cost included in Muzaffarpur.
	1896-97 ...	417	22,871	638	545	638	545	90,354	54·84	165·78	220·62	5½	17,089
	1897-98 ...	598	24,690	965	733	965	733	1,22,730	41·28	167·4	208·68	5	84,544
	1898-99 ...	619	21,013	916	684	916	684	1,01,535	34	148	182	Over 4½	1,40,693
		11,769	4,36,504	14,448	10,828	14,476	10,829	15,72,291	.....	.....	.....	.....	17,90,394
Total ...	1891-92 ...	1,610	55,891	.....	.....	.....	.....	.....	35	.....	.....	.....	.....
	1892-93 ...	2,994	1,03,696	1,397	945	1,286	766	1,19,961	35	139	174	Nearly 4½	56,101
	1893-94 ...	2,770	1,07,916	3,179	2,045	2,948	1,914	2,63,739	39	132	171	Over 4	1,28,223
	1894-95 ...	642	26,283	2,360	2,244	2,700	2,531	3,32,568	40	137	177	Nearly 4½	2,22,472
	1895-96 ...	1,637	40,911	2,710	2,312	2,740	2,336	2,99,602	46	126	172	,, 4½	3,63,294
	1896-97 ...	479	28,847	970	757	970	757	1,54,250	.....	.....	.....	,, 7	3,12,258
	1897-98 ...	659	32,828	1,847	1,290	1,847	1,290	2,28,776	49	177	226	Over 5	3,55,174
	1898-99 ...	978	40,132	1,985	1,235	1,985	1,235	1,73,395	41	140	181	,, 4½	3,52,872
		11,769	4,36,504	14,448	10,828	14,476	10,829	15,72,291	.....	.....	.....	.....	17,90,394

(a) Include topographical survey.
(b) Including Saran.
(c) Includes 28 square miles of Majhauli Ward's estate, and excludes 11 square miles of river areas actually surveyed, but which, owing to the midstream boundary belong to the North-Western Provinces.
N. B.—The figures for Saran for the year 1898-99 do not include topographical survey of 61 *diara* villages, with an aggregate area of 56·83 square miles. The expenditure amounted to Rs. 719, or Rs. 13 per square mile.

During the year under report the survey of the entire district of Saran was brought to a close, the area of the district being found to be 2,620 square miles. The survey of the districts of Muzaffarpur and Champaran had been completed previously, the work since done in the former district being revision or *diara* surveys of small areas; while in Champaran the work in progress is the topographical survey of a jungly tract in the north of the district which was excluded from the cadastral survey and about 80 miles of which remained to be surveyed at the close of the year.

Survey of private estates in the Sonthal Parganas.

9. In the Sonthal Parganas the professional Survey Department has been entrusted with the traverse survey only of the estates brought under settlement, the field survey being in the hands of the Settlement staff. The original proposal was to survey 1,855 villages comprising an aggregate area of 616

square miles, and the cost of the traverse survey was estimated by the Director of Land Records at Rs. 40 per square mile, or Rs. 25,000 in round numbers for the whole area. On an application made by this Government, the Government of India sanctioned the payment of the estimated cost from the Imperial revenues. Subsequently 56 more villages, with an aggregate area of 14·8 square miles, were notified by Government for survey and settlement. The report now before Government shows that the total area traversed is 726 square miles and the total cost Rs. 32,693, or Rs. 45 per square mile. But in compliance with an application made by this Government upon a revised estimate submitted through the Director of Land Records and the Board, the Government of India have sanctioned an allotment of only Rs. 18,921 to meet the cost of the traverse survey of these estates. The Lieutenant-Governor does not understand why, when the actual expenditure was Rs. 32,693, the amount shown in the revised estimate referred to was only Rs. 18,921, and will await an explanation in this matter.

10. The passing of the Bengal Tenancy Amendment Act, III (B.C.) of 1898, which came into force on the 2nd November 1898, effected a very important change in the settlement procedure. The Settlement Officer of North Bihar writes as follows on this subject:—

Settlement.

"Briefly put, it enables us to pass an entire thana or any given area through each stage of the work at one time. Under the old Act, we had to wait a month after attestation for applications for the settlement of fair rents to be filed. If none were filed, we proceeded to draft publish, but it often happened that applications were filed in half the villages in a camp and not in the other half. This meant that the whole area had to be kept pending until all the fair-rent cases were settled. Even after we had got all the villages draft published, a few scattered section 106 cases might delay final publication and prevent us from beginning recovery of costs. Thus under the old Act it invariably took us four years to complete operations, including recovery of costs, in any given area, and the work was very often spread over five seasons. Under the Amendment Act, however, as I shall explain, we ought in ordinary circumstances to complete all stages of the work in three seasons. We now draft publish within a few days of the completion of attestation, in itself no mean advantage, as our experience this year has shown us what a much keener interest is taken in draft publication carried out while the record is still fresh in the minds of the people, than when it is effected, as formerly, weeks and often months after the conclusion of attestation. We get all the objections under section 103A filed within a month of draft publication, and we can put a special set of officers on to deal with them. We can complete the records and finally publish them immediately after the objections are disposed of, and the whole area is then ready for recovery.

The following should now be our normal programme of work in any given area:—

First year—		
Field season	...	Cadastral survey and preliminary record-writing.
Recess	...	Preparation of the draft record by the Survey Department.
Second year—		
Field season	...	Attestation and draft publication.
Recess	...	Disposal of objections under section 103A, completion of the records, and final publication.
Third year—		
	...	Recovery of costs and disposal of case-work under sections 105 and 106 after final publication.

Nor is the clear saving of a year which is thus effected the only gain. The work itself is more expeditiously and satisfactorily carried through. When an officer, for example, has only section 103A cases to dispose of, he can arrange his programme much better and get through his work much faster than formerly, when he had to try summary objections in one village, settle fair rents in another, and decide disputes in a third, and there were necessarily days which he had to spend in travelling long distances or on which he found himself with little or no work to do. Much time is also saved in final publication, as the kanungo can now work steadily through his area instead of taking up isolated villages as the records are completed in office."

The experience so far obtained of the working of the remaining amendments of the Act has been small, and scarcely permits of a final appreciation of their effect.

The rules for record-writing and attestation in North Bihar were revised in the course of the year, so as to bring them into accord with the amending Act.

The following paragraphs show the progress made in settlement work.

North Bihar.

11. The post of Settlement Officer of North Bihar was held by Mr. C. J. Stevenson-Moore, I.C.S., till the 12th July 1899, when, after completing the operations in the districts of Muzaffarpur and Champaran, and submitting his final reports thereon, he went on furlough, and was succeeded by Mr. J. H. Kerr, I.C.S., who had previously held subordinate charge of the operations in Champaran and Darbhanga.

The following statement shows the work done year by year in each district in North Bihar from the commencement of the settlement proceedings up to the close of the past settlement year:—

	Attestation.				Draft records published.	Settlement of fair rents under section 104 of the Bengal Tenancy Act.			Cases under section 105 (section 103A of new Act).		Cases under section 106.		Final records published.
	Area in square miles.	Number of villages.	Number of plots.	Number of tenancies.	Number of villages.	Number of cases disposed of.	Number of tenants affected.	Rents raised or lowered by decisions up to date.	Number of objections filed.	Number of objections disposed of.	Number instituted.	Number disposed of (inclusive of cases pending from previous years).	Number of villages.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Muzaffarpur—													
1892-93 ...	66·0	320	119,821	35,799	311	66	713		926	868	363	187	.....
1893-94 ...	376·0	712	487,099	150,069	696	117	2,273		3,235	3,029	952	840	.....
1894-95 ...	746·40	1,361	1,130,745	279,004	1,265	435	2,646		7,492	6,568	808	870	768
1895-96 ...	1,319·43	1,633	2,083,026	458,038	1,541	1,859	3,862	+18·88	10,817	7,697	685	315	1,161
1896-97 ...	436·42	477	595,403	107,440	550	1,281	6,987		9,353	12,576	1,309	770	1,729
1897-98 ...	14·46	5	15,849	3,175	121	863	3,864		2,397	3,290	801	1,785	698
1898-99 ...	4·0	7	683	344	28	.....	.....	.....	23	81	.....	348	194
Champaran—													
1892-93 ...	46·43	76	34,340	7,774	66	38	1,385		48	48	40	27	.....
1893-94 ...	380·0	231	323,511	61,022	300	184	15,720		2,356	2,226	206	203	49
1894-95 ...	491·45	372	470,660	73,695	251	323	17,896		1,690	1,097	320	328	252
1895-96 ...	1,162·0	1,084	1,358,793	193,611	631	1,029	34,633	+9·19	4,126	3,971	393	322	372
1896-97 ...	665·0	490	339,511	66,698	718	514	24,970		3,532	4,050	1,814	914	891
1897-98 ...	549·0	602	267,975	47,356	889	485	15,833		688	1,022	416	1,386	776
1898-99 ...	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	.....	92	515
Saran—													
1893-94 ...	19·0	68	33,155	5,130	68	33	426		1,034	947	41	31	.....
1894-95 ...	487·41	1,160	749,533	125,315	265	1,787	19,783		415	98	23	21	57
1895-96 ...	.....	.....	.....	.....	867	1,385	21,729	+10·8	9,487	7,143	116	22	11
1896-97 ...	477·09	934	920,013	173,819	623	1,183	7,168		4,268	6,452	503	256	998
1897-98 ...	380·28	605	787,950	144,616	797	788	8,522		9,031	8,681	834	678	912
1898-99 ...	548·0	871	1,175,593	199,678	996	26	188		24,798	25,712	1,841	914	862
Darbhanga—													
1897-98 ...	533·52	621	1,038,442	197,374	585	300	1,114	+7·8	6,985	5,121	48	1	24
1898-99 ...	718·0	957	1,071,259	237,385	1,007	30	194		19,221	19,419	362	147	578
Total—													
1892-93 ...	112·43	396	154,161	43,573	377	104	2,098	.....	974	916	403	214	.....
1893-94 ...	775·0	1,011	843,765	216,221	1,064	334	18,419	.....	6,626	6,202	1,199	1,074	.....
1894-95 ...	1,725·26	2,893	2,350,938	478,014	1,781	2,545	40,325	.....	9,597	7,763	1,151	1,219	1,072
1895-96 ...	2,481·43	2,717	3,441,819	651,649	3,039	4,273	60,224	.....	24,430	18,811	1,194	659	1,544
1896-97 ...	1,578·51	1,901	1,854,927	347,957	1,891	2,978	39,125	.....	17,153	23,078	3,626	1,940	3,618
1897-98 ...	1,477·26	1,833	2,110,216	392,515	2,392	2,434	29,333	.....	19,101	18,114	2,099	3,850	2,410
1898-99 ...	1,270·0	1,835	2,247,535	437,407	2,031	56	382	.....	44,042	45,221	2,003	1,501	2,149
Grand Total	9,419·89	12,586	13,003,361	2,567,336	12,575	12,724	189,906	.....	121,922	120,105	11,675	10,457	10,793

Before the close of the year the settlement records of the districts of Muzaffarpur and Champaran were made over to the respective Collectorates. The settlement offices were finally closed, and the only work remaining to be done is the recovery of a portion of the costs. This is now in progress under the supervision of the Collectors concerned.

Saran.

12. Mr. H. Coupland, I.C.S., was in subordinate charge of the operations in this district throughout the year, except for a month's privilege leave, during which Maulvi Ghulam Ghous carried on the current duties of the office. The attestation programme for the year was fully carried out. The boundary disputes instituted during the year numbered 434, of which all but 4 were disposed of. Only 35 appeals were preferred against the decisions of the Assistant

Settlement Officers, and the orders of the lower court were maintained in all but one case. As usual the *diara* villages on the Gogra and Gandak rivers furnished the most difficult boundary disputes. The attestation work, which embraced nearly 12 lakhs of plots, appears to have been free from abnormal difficulties; but the absence of large zamindaris similar to the Hatwa Raj, and the consequent inability to utilise properly prepared accounts, caused no lack of minor worries. The estates of the Chainpur Babus presented typical difficulties inherent in the co-proprietary system, and in the failure to keep, or to produce, genuine accounts. Of the 199,678 holdings attested 2·5 per cent. were found to be held by proprietors, ·4 per cent. by raiyats at fixed rates, 78 per cent. by raiyats with occupancy rights, 3 per cent. by non-occupancy raiyats, and 9 per cent. by rent-free-holders. The objections under section 103A of the new Act were unusually numerous, the number filed during the year being 24,798 as compared with 9,031 (under section 105 of the Act of 1885) in the previous year. This is attributed to the provisions of the amending Act of 1898, under which draft publication takes place immediately after attestation, instead of, as under the old Act, after the disposal of fair-rent cases. The Director of Land Records observes:—

"On the whole I think that the increase should be looked upon as satisfactory and indicating a greater interest in the proceedings on the part of the persons affected by them, and greater care in their scrutiny of our papers. The trial of these objections brings to light many inaccuracies in the record which might otherwise have escaped observation, and the proportion of frivolous cases filed is not so great as to seriously detract from that advantage."

There would, however, appear to be something in the opinion, quoted elsewhere in the report, that the shortening of the period within which objection can be taken to the record has multiplied these cases by leaving less to the influence of time in promoting reflection and negotiation and consequent mutual concession. Fifteen appeals were filed against the orders passed in these cases, of which 4 were decided, the decision of the Assistant Settlement Officer being upheld in 3 and modified in 1. For the settlement of fair rents only 31 cases were instituted during the year, and none of these referred to the area attested in 1898-99. The Director of Land Records observes that the small number of applications made by native landlords for a legal enhancement of the rents of their raiyats is as noticeable in Saran as it was in Muzaffarpur. It is stated that out of a total of 360 appeals instituted before the Special Judge against the decisions passed in fair-rent cases, 331 have been disposed of, the Assistant Settlement Officer's decisions being upheld in 102 cases, slightly modified in 147 cases, and reversed in 33 cases, 8 cases being compromised and the rest remanded for re-trial. Under section 106, 914 disputes were decided during year. The number of appeals to the Special Judge against these decisions instituted since the beginning of the operations, during which 1,240 cases in all have been disposed of by the settlement staff, was 94 only, 41 of which were decided, resulting in the Assistant Settlement Officer's decision being upheld in 28 cases and reversed in 8, while 3 cases were compromised and 2 returned for re-trial.

Darbhanga.

13. The settlement operations in Darbhanga were under the subordinate charge of Mr. J. H. Kerr, the present Settlement Officer of North Bihar, until March 1899, when he went on privilege leave, and was succeeded by Mr. W. S. Adie, I.C.S.; and the latter was succeeded in August 1899 by Mr. W. R. Gourlay, I.C.S., who remained in charge until the close of the year.

The programme of supervision of the initial record-writing and settlement of boundary disputes in 680 square miles was fully carried out. Only 10 out of 709 boundary disputes instituted during the year remained to be decided. In 113 cases appeals were preferred and decided, the decision of the Settlement Officer being upheld in 76 cases, modified in 5 and reversed in 1. The remaining 31 cases were remanded for re-enquiry. The outturn of attestation work apparently fell short of the programme (746 square miles) by 28 square miles. Of the total number of holdings attested, 82 per cent. were found to be held by raiyats with occupancy rights, ·5 per cent. by non-occupancy raiyats, about 6 per cent. by proprietors and 3 per cent. by rent-free-holders. The area

in which work was proceeding embraced part of the Darbhanga Raj estates, wherein the system of management has for many years been very thorough; and progress was thereby much facilitated. In the extensive zamindari of Rai Ganga Prasad however, not only was little help derived from estate papers, which were in great confusion, but even such as were produced were, it is regrettable to observe, not of a reliable character. From the report of the Settlement Officer it would appear that the raiyats of this proprietor and of Ganeshwar Singh, of Padri, have hitherto been treated with a degree of harshness which has amply justified the preparation of a record of their rights. As in Saran there were few enhancements of rent; the average size of fields was found to be very small (·38 of an acre); and the number of cases under section 103A enormously increased compared with the previous year. It would appear that as a whole the operations in this district were conducted with a very high measure of success.

Recovery of costs.

14. The recovery of costs of the operations was in progress in the districts of Muzaffarpur, Champaran, and Saran. As regard Darbhanga, orders apportioning the costs were passed in May 1899. With regard to thanas Dalsingsarai, Samastipur and Warisnagar, the total cost was estimated at $9\frac{3}{4}$ annas per acre, of which $2\frac{1}{2}$ annas will be paid by Government, and $4\frac{1}{4}$ annas will be recovered from the landlords, and 3 annas from the raiyats. Computation was begun in this district in July, 534 villages covering 296 square miles being completed before the end of September 1899, and the work of recovery, commenced since the close of the year, is now in progress.

The following table shows the results of the recovery work in the three other districts:—

Name of District.	Approximate total demand.	Demand computed up to the end of the year.	Recoveries. In previous years.	Recoveries. In 1898-99.	Recoveries. Total.	Unrecovered balance of the computed demand.	Percentage of recoveries.	Percentage of cost of recovery to amount recovered. In previous years.	Percentage of cost of recovery to amount recovered. In 1898-99.	Percentage of cost of recovery to amount recovered. From beginning to end of the year.
1	2	3	4	5	6	7	8	9	10	11
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.				
Muzaffarpur	7,64,633	7,64,333	4,83,669	2,62,036	7,45,705	18,928	97·5	6·5	*	
Champaran	7,85,882	7,85,382	3,71,639	1,74,492	5,46,131	2,39,251	69·5	6·1	*	
Saran	8,40,000	3,64,773	1,54,938	1,86,661	3,41,599	23,174	93·6	5·64	5·81	5·73
Total ...	23,90,015	19,14,488	10,10,246	6,23,189	16,33,435	2,81,353	85·3			

* In Muzaffarpur and Champaran the work of recovery of costs was in the hands of the district staff, and apparently no separate expenditure was incurred on this account.

The heavy balance shown in the case of Champaran is almost entirely due from the proprietors of the Bettiah and Ramnagar Raj Estates. The Bettiah Raj has arranged to pay its dues in instalments, and certificates are being issued for the amounts due from the Ramnagar Raj and other landlords. As in previous years the realisations from the tenants were remarkably good, as much as 98·81 per cent. of the amount due by raiyats having been collected in Saran.

Maintenance of records.

15. The question how the Land Records Maintenance Act, III (B.C.) of 1895, has worked, and what steps, if any, should be taken for the maintenance of the settlement records in future, is separately under the consideration of Government.

Orissa.

16. Mr. S. L. Maddox, I.C.S., was in charge of the Orissa Settlement throughout the year.

The Bengal Tenancy Amendment Act, III (B.C.) of 1898, was extended to Orissa in November 1898; but the operations were too far advanced for its provisions to have much effect on the progress made in the temporarily-settled estates, although they enabled the Settlement Officer to wind up the work in the permanently-settled areas more expeditiously.

The following table exhibits the work done during the year :—

Name of District.	Number of Assistant Settlement Officers employed during the year or for part of the year.	Village boundary disputes decided under the Bengal Survey Act.	Area in square miles for which records were attested.	Number of tenants for whom rents were settled.	Number of villages for which draft records were published.	Number of objections heard and considered after draft publication.	Number of disputes decided under section 106.	Number of villages of which records were finally published.	Number of villages for which final khatians were copied, checked, and compared.	Number of Estates assessed to revenue by Settlement Officer.
1	2	3	4	5	6	7	8	9	10	11
Temporarily-settled Estates.										
Cuttack.										
Village 4,346 ... ... Area 2,029 square miles.	17	...	...	30,000	435	4,145	558	817	601	1,377
Balasore.										
Villages 3,593 ... ... Area 1,712 square miles.	9	87	...	15,760	262	4,246	71	327	199	397
Puri.										
Villages 1,968 ... ... Area 1,089 square miles.	2	...	...	...	27	...	...	27	205	187
Total—Villages 9,907, area 4,830 square miles ...	28	87	...	45,760	724	8,391	629	1,171	1,005	1,961
Government Estates.										
Khurda Government Estate in Puri.										
Villages 1,377 ... ... Area 913 square miles.	3	...	...	...	...	7	112	...	...	...
Revenue-free and permanently-settled Estates, &c.,										
Cuttack. Madhupur Estate.										
Villages 199 ... ... Area 63 square miles.	...	...	...	...	...	...	...	199	49	...
Derabisi.										
Villages 120 ... ... Area 52 square miles.	...	...	52	...	120	...	...	...	17	...
Puri. Revenue-free area.										
Revenue-free area villages 178 ... ... Area 85 square miles.	...	...	78	2,124	178	1,139*	78*	178	...	...
Khurda.										
Ekrajat (Puri temple) Jagir and revenue-free area.										
Villages 141 ... ... Area 123 square miles.	...	...	123	13,205	141	1,279	68	141	141	...
	...	...	253	15,329	439	2,418	146	518	207	...

* (Includes figures for Puri temporarily-settled area.)

With the exception of the permanently-settled areas of Aul and Derabisi, the work in Orissa has been completed, some small items which remained over after 30th September 1899 having been done since the close of the year. The work in Aul and Derabisi has been undertaken by the Collector of Cuttack.

The result of the settlement of fair-rents in the temporarily-settled area during the year was to increase the rents of *kharida jamabandi* tenures by 48 per cent. of *nisfi* (half-rent) *baziafti* tenures by 190 per cent., of *kamil* (full rent) *baziafti* tenures by 63 per cent., and of *raiyati* holdings by 7 per cent. The enhancement in each district from the beginning is shown in the table below :—

District.	Number of tenants for whom fair rents have been settled.	Existing assets dealt with to end of 30th September 1899.	Settled assets down to 30th September 1899.	Increase obtained.	Percentage of increase over existing assets.
1	2	3	4	5	6
		Rs.	Rs.	Rs.	
Cuttack ...	777,714	18,34,198	20,77,083	2,42,885	13·24
Balasore ...	475,079	9,85,060	11,61,977	1,76,917	17·96
Puri ...	258,641	5,44,686	6,22,317	77,631	14·25
Khurda ...	197,324	3,09,261	3,77,127	67,866	21·94
	1,708,758	36,73,205	42,38,504	5,65,299	15·4

The assessment of revenue in the temporarily-settled area was completed and the new revenue brought into force. In a large number of cases the assessments still require the confirmation of higher revenue authorities; but in accordance with the terms of the engagements given by the proprietors, the new revenue is being realised subject to such modifications as may be made by the confirming authorities, and it is considered unlikely that the orders to be passed in the pending cases will result in any considerable alteration of the revenue assessed. The following table shows the results of the assessment:—

District.	Estates of which assessment has been confirmed.					Estates of which the assessment is pending confirmation.					Total.				
	Number of estates.	Old revenue.	New revenue.	Increase.	Percentage of increase.	Number of estates.	Old revenue.	New revenue.	Increase.	Percentage of increase.	Number of estates.	Old revenue.	New revenue.	Increase.	Percentage of increase.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Rs.	Rs.	Rs.			Rs.	Rs.	Rs.			Rs.	Rs.	Rs.	
Cuttack ...	3,152	2,32,871	3,46,479	1,13,608	49	1,300	4,80,339	7,51,939	2,71,550	56	4,452	7,13,260	10,98,418	3,85,158	54
Balasore ...	768	93,761	1,55,961	62,200	66	645	2,82,278	4,68,645	1,86,367	66	1,413	3,76,039	6,24,606	2,48,567	66
Puri (excluding Khurda).	278	1,42,873	1,86,929	44,056	30	207	1,49,932	1,89,674	39,742	26	485	2,92,805	3,76,603	83,798	29
Total ...	4,198	4,69,505	6,89,369	2,19,864	47	2,152	9,12,599	14,10,258	4,97,659	54	6,350	13,82,104	20,99,627	7,17,523	52

Of the total of 6,350 estates, *kabuliyats* by the close of the year had been taken for 6,284 estates. The Director of Land Records reports that only six estates are recusant, of which five are insignificant, and the only one of importance is the Kotdesh Estate in Puri, which has been bought by three different sets of purchasers, to all of whom the former proprietors were seriously indebted. It is stated that the new proprietors cannot come to any working agreement among themselves, and that as the estate is very large, the old revenue being Rs. 81,000 and the new Rs. 1,04,000, there seems no prospect of effecting a settlement. The Collector of the district has taken over the papers of the estate. With this exception the new assessment of revenue has practically been accepted in all cases, and this is a strong testimony to the consideration with which it has been made. The final report on the settlement will shortly be in the hands of Government.

Chittagong.

17. The settlement of Chittagong had practically been completed in March 1898, and nothing but office work and the computation and recovery of the costs of the operations in the permanently-settled estates remained to be done in the year under report. Good progress was made in the classification and copying of the settlement records, and it was expected that this work would be completed before the 31st March 1900. Final orders as to the apportionment of the costs have been issued; but no progress was made towards their recovery in the year under report.

Tippera.

18. All important work connected with the settlement of the estates of the Raja of Hill Tippera in the districts of Tippera and Noakhali was completed by the middle of July 1899, when the Settlement Officer, Mr. J. G. Cumming, I.C.S., reverted to general duty, and the Collector of the district took charge of what remained to be done. The general result of the settlement, so far as the Tippera Raj is concerned, is that the Raj has secured an increase in rental, amounting to Rs. 90,206, of which Rs. 31,781 have been obtained from the tenure-holders and Rs. 58,425 from the *khas* raiyats. The recovery of a share of the costs of the operations from the tenure-holders and raiyats was continued during the year. The total computed demand is Rs. 3,19,245, out of which Rs. 2,2[illegible],501, or about 71 per cent., were collected up to the close of the year. The progress made is satisfactory.

Private estates in the Sonthal Parganas.

19. The settlement of certain private estates in the Sonthal Parganas on the application and at the expense of the proprietors is being made by Mr. H. McPherson, I.C.S., who joined in November 1898. Mr. E. F. Berkeley, the officer in charge of the traverse survey, was appointed Assistant Settlement Officer, and placed in charge of the field survey, in addition to his own duties, under the direct control of the Settlement Officer. As it was considered desirable to employ residents of the district as amins, it was necessary first to train them. Accordingly a survey training school was opened, and besides 112 Sonthal amins, 80 non-Sonthal amins, and five kanungos, the five Assistant Settlement Officers went through a course of training there. Some of the amins, however, soon left their employment, and the work was greatly retarded,

especially at the end of the season, by the absence of a sufficient number of trained men. Rules for the conduct of the survey and preliminary record-writing, and for the attestation of records and settlement of rents were drawn up. The area under settlement comprised 1,911 villages, of which 778 villages, covering 341 square miles, were cadastrally surveyed, and preliminary records for 742 villages were written. A very large number of internal disputes and 481 of the 512 boundary disputes instituted were decided; and the records of 12 villages were experimentally attested; but the last-named work will probably have to be done over again under the rules as recently revised. The cost during the year, exclusive of traverse survey, amounted to Rs. 80,259. Considering the delay at the commencement of the operations, the introduction of a new system of survey and settlement, and the difficulties found in training a subordinate staff, the Lieutenant-Governor agrees with the Director of Land Records that the progress made is satisfactory.

Services of Officers.

20. The Lieutenant-Governor's thanks are due to the Board of Revenue for their careful supervision of the work of the Survey and Settlement Departments. Sir John Woodburn has on previous occasions expressed his appreciation of the excellent work done by Mr. Lyon, and he has much pleasure in endorsing the remarks of the Board in paragraph 32 of their present review. His Honour's acknowledgments are due also to Captain R. T. Crichton and Captain C. W. H. Symonds for their excellent administration of the Survey Department during the year.

The remarks of the Director of Land Records on the conduct of his subordinates, contained in paragraph 63 of his report, and those of the Superintendent of Settlement-Surveys in paragraph 60 of the Survey Report, have been read with pleasure by the Lieutenant-Governor. The former will be communicated to the Appointment Department, and the latter to the Deputy Surveyor-General in charge, Revenue Branch, Survey of India.

ORDER.—Ordered that this resolution be published in the *Calcutta Gazette*, and that a copy of it, with copies of the two reports, be submitted to the Government of India.

By order of the Lieutenant-Governor of Bengal,

F. A. SLACK,

Offg. Secretary to the Govt. of Bengal.

No. 582T.—R.

COPY, with a copy of the Survey Report, forwarded to the Deputy Surveyor-General in charge, Revenue Branch, Survey of India, for information.

No. 583T.—R.

COPY with a copy of the Report of the Director of Land Records, forwarded to the Appointment Department of this Government for information, with special reference to paragraph 20 of the Resolution.

No. 584T.—R.

COPY forwarded to the Secretary to the Board of Revenue, Land Revenue Department for the information of the Board, with reference to his letter No. 192A., dated the 19th February 1900, and for communication to the Director of Land Records, the Superintendent of Settlement Surveys, all Commissioners of Divisions, District Officers and Settlement Officers.

By order of the Lieutenant-Governor of Bengal,

E. LISTER,

Offg. Under-Secy. to the Govt. of Bengal.

DARJEELING;
The 26th May 1900.

E. J. H.—Reg.—No. 1224C—1048—31-5-1900.

FORWARDED BY ORDER OF THE LIEUTENANT
1901
BENGAL

ANNUAL REPORT

ON THE

SURVEY OPERATIONS IN BENGAL

DURING THE YEAR

1899-1900

From 1st October 1899 to 30th September 1900.

Calcutta:
PRINTED AT THE BENGAL SECRETARIAT PRESS.
1901.

Published at the BENGAL SECRETARIAT BOOK DEPÔT,
Writers' Buildings, Calcutta.

OFFICIAL AGENTS.

In India—

THACKER, SPINK & Co., Calcutta.
W. NEWMAN & Co., Calcutta.
THACKER & Co., Bombay.
HIGGINBOTHAM & Co., Madras.
SUPERINTENDENT, AMERICAN BAPTIST MISSION PRESS, Rangoon.
E. SEYMOUR HALE, 53, Esplanade Road, Fort Bombay.
RAI SAHIB M. GULAB SINGH & SONS, Proprietors of the Mufid-i-am Press, Lahore, Punjab.

In England—

E. A. ARNOLD, 37 Bedford Street, Strand, W. C., London.
CONSTABLE & Co., 2 Whitehall Gardens, S. W., London.
SAMPSON LOW, MARSTON & Co., St. Dunstan's House, Fetter Lane, E. C., London.
P. S. KING & SON, 9 Bridge Street, Westminster, S. W., London.
LUZAC & Co., 46 Great Russell Street, W. C., London.
KEGAN PAUL, TRENCH, TRÜBNER & Co., Charing Cross Road, W. C., London.
B. QUARITCH, 15 Piccadilly, W., London.
WILLIAMS AND NORGATE, Oxford.
DEIGHTON BELL & Co., Cambridge.

On the Continent—

FRIEDLÄNDER & SOHN, 11 Carlstrasse, Berlin.
OTTO HARRASSOWITZ, Leipzig.
KARL W. HIERSEMANN, Leipzig.
ERNEST LEROUX, 28 Rue Bonaparte, Paris.
MARTINUS NIJHOFF, The Hague.

INDEX TO CONTENTS

CHAPTER I.

		PAGE
GENERAL REMARKS ON THE PROVINCIAL SURVEYS		1

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND ON RECORDS OF RIGHTS IN TEMPORARILY-SETTLED TRACTS AND GOVERNMENT ESTATES UNDER SETTLEMENT OF RENTS AND LAND REVENUE.

MAJOR SETTLEMENTS.

BHAGALPUR DIVISION .	SONTHAL PARGANAS DISTRICT.	GOVERNMENT ESTATE (DAMIN-I-KOH.	8
BHAGALPUR DIVISION .	SONTHAL PARGANAS (PRIVATE ESTATES).	TRAVERSE SURVEY .	12

PART II.—REPORTS ON SURVEYS AND ON RECORDS OF RIGHTS IN PRIVATE ESTATES.

MAJOR SETTLEMENTS.

PATNA DIVISION . .	MONGHYR	DISTRICT—TRAVERSE SURVEY .		13
	DARBHANGA	„ CADASTRAL „ .		16
	„	„ BADAR WORK .		18, 21

PART III.—REPORTS ON MISCELLANEOUS SURVEYS.

CHITTAGONG DIVISION .	NOAKHALI	DISTRICT—TRAVERSE AND TOPOGRAPHICAL SURVEY.		22
BENARES „ .	BALLIA	„ (MAUZA JAUHI) TRAVERSE SURVEY.		23
	„	„ CADASTRAL SURVEY		24
PATNA DIVISION . .	SARAN	„ CHAPRA MUNICIPALITY .		25
	„	„ SARAN—PATNA DIARA .		*ib.*
	DARBHANGA	„ DARBHANGA MUNICIPALITY .		26
	SHAHABAD	„ KACHUAR MAHAL „ .		27
	„	„ ARRAH TOWN .		28
	„	„ SEMRI AND LAKHAN DIHRA ESTATES.		*ib.*
BHAGALPUR DIVISION .	MONGHYR	„ BINDA DIARA-BANAILI RAJ DISPUTE.		*ib.*
	BHAGALPUR	„ NEPAL FRONTIER . . .		*ib.*

CHAPTER III.

PART I.—PROGRAMME OF SEASON 1900-1901		29
„ *II.*—TOURS OF THE SUPERINTENDENT OF SETTLEMENT-SURVEYS . .		30
„ *III.*—SERVICES OF OFFICERS		*ib.*

LIST OF APPENDICES.

		Page.
APPENDIX	*I.*—SUMMARY OF OUTTURN	31
„	*II.*—STATEMENT OF EXPENDITURE	32
„	*III.*— DITTO OF COST RATES PER SQUARE MILE	40
„	*IV.*— DITTO OF INSPECTIONS BY OFFICERS	*ib.*
	V.—REPORT ON THE BENGAL DRAWING OFFICE	41

LIST OF INDEX MAPS.

PROVINCE OF BENGAL		*To face page*	1
SONTHAL PARGANAS DISTRICT		„ „	8
MONGHYR	„	„ „	14
DARBHANGA	„	„ „	16
NOAKHALI	„	„ „	22

ANNUAL REPORT

OF

THE SUPERINTENDENT OF SETTLEMENT-SURVEYS, BENGAL,

ON THE

SURVEY AND RECORD OF RIGHTS OPERATIONS IN BENGAL

DURING THE YEAR 1899-1900.

No. $\frac{2655}{R/7-103}$.

FROM CAPTAIN A. MEARS, I.S.C.,

Offg. Superintendent of Settlement-Surveys in Bengal,

TO THE SECRETARY TO THE BOARD OF REVENUE, LOWER PROVINCES.

Dated Bhagalpur, the 5th December 1900.

SIR,

I HAVE the honour to submit the report on the Provincial Survey Operations carried out in Bengal during the past survey year, namely, from the 1st October 1899 to the 30th September 1900.

The administrative charge of the operations was held by Captain C. W. H. Symonds, I.S.C., from the 1st October 1899, till the 10th March 1900, on which date he handed over temporary charge to me, pending the arrival of Major G. B. Hodgson, I.S.C., and proceeded on furlough. This charge I only held till the 7th April 1900, when I was relieved of my duties by Major G. B. Hodgson, who continued in charge of the operations till the end of the year under report. On account of Major Hodgson's ill-health, and his being obliged to take leave under medical certificate, I have had to act for him and submit this report.

CHAPTER I.

GENERAL REMARKS.

Programme for the year.

2. The programme for 1899-1900 as sanctioned by the Bengal Government provided for the operations shown in the subjoined statement:—

District.	Traverse.	Cadastral.		Topographical.
		Survey.	Khanapuri.	
	Sq. m.	Sq. m.	Sq. m.	Sq. m.
Darbhanga	...	941	941	...
Monghyr	655	...	...	...
Sonthal Parganas (Damin-i-Koh)	700	...	...	...
Noakhali	50	...	...	50(*a*)
Jauhi village (Ballia) ...	7	7	7	...
Nepal	(*b*)	...	...	...
Kachuar Mahal	(*c*)	...	...	...
Total ...	1,412	948	948	50

(*a*) Topographical survey on the 4-inch scale of certain "chars."
(*b*) Relaying boundary and fixing sites for reference pillars.
(*c*) Relaying old boundary marks.

3. The following tabular statement gives the outturn in square miles completed under each description of survey:—

Division.	District and estates.	Traverse survey.	Cadastral survey.	Record writing.	Topographical survey on the 4-inch scale.
1	2	3	4	5	6
Temporarily settled and Government Estates.					
Major settlements.					
Bhagalpur	Sonthal Parganas (Damin-i-Koh Government Estates).	624·41	...	...	...
Private Estates.					
Major settlements.					
Bhagalpur	Sonthal Parganas. (Private estates).	134·40	...	...	...
	Monghyr	541·45	...	...	...
Patna	Darbhanga	(a)	(b)916·63	(b)730·64	...
Miscellaneous.					
Patna	Darbhanga (Municipality) ...	...	...	(c)3·52	...
	Saran-Patna Diara	(d)	...	...	...
	Shahabad (Kachuar Mahal)...	(e)	...	...	...
	„ (Semri and Lakhan Dehra estates).	7·01	...	...	...
	„ (Arrah Town) ...	2·27	...	...	...
Bhagalpur	Monghyr (Binda Diara) ...	(f)	...	...	...
	Nepal Frontier	(g)	...	...	...
Chittagong	Noakhali	61·84	...	...	(h)5·7
Benares	Ballia (Mauza Jauhi) ...	8·45	6·77	6·77	...
	Total ...	1,379·83	923·40	740·93	5·7

(a) Relaying of lost traverse stations in thanas Benipatti, Khajauli and Phulparas.
(b) This difference in the areas is due to the curtailment of the khanapuri programme in thana Khajauli.
(c) Khanapuri and completion of records of the municipal area surveyed in detail during season 1898-99.
(d) Fixing and marking of village trijunctions (see detailed report).
(e) Relaying stations on the Kachnar Mahal and Banskatti boundary.
(f) Relaying boundary between the Binda Diara (Government Estates) and the Banaili Raj Estates.
(g) Fixing sites for reference pillars on the Nepal-Bhagalpur boundary.
(h) Six sheets of this survey were done on the 16″=1 mile scale, the balance on the 4-inch scale.

4. The following statement shows the programme sanctioned by Government and the actual areas completed during the year:—

	Traverse.	Cadastral.		Topographical.
		Survey.	Khanapuri.	
Area for survey sanctioned by Government ...	1,412	948	948	50
Area completed during season 1899-1900 ...	1,380	924	742	6
Difference ...	—32	—24	—206(a)	—44(b)

(a) Deficit due to reduction of cadastral programme in district Darbhanga.
(b) The reason for this small outturn in topographical survey is given in paragraph 41 of the report.

5. During the past field season there were—

Angular observations with the theodolite (a)	51,359
Linear miles of traversing (a)	6,882·2
Astronomical observation for Azimuth	294
Connections to stations of the great Trigonometrical Survey ...	9
Permanent marks embedded at village tri-junctions ...	3,543
Temporary marks embedded (Cylinders)	11,913
„ „ „ (Pegs)(b)	21,189
Villages embraced in the survey operations	738
Fields in these villages	15,01,294
Linear miles of test survey	5,218
Entries checked in the records by Survey Officers and Inspectors	3,64,869

(a) Includes re-traversing and re-laying of lost stations in thanas Benipatti and Khajauli, district Darbhanga.
(b) Includes 807 bricks used for marking traverse stations in the survey of the Arrah Municipality.

6. The subjoined statement gives, according to their various scales, the number of sheets on which the survey has been mapped:—

	No. of sheets.
Cadastral survey on 16 inches = 1 mile	1,302
Topographical survey on 16 inches = 1 mile	6
" " " 4 inches = 1 mile	13
Survey of village sites on 64 inches = 1 mile of such village sites as it was impossible to find space for on the margin of the 16-inches sheets	954

7. From the following statement will be seen the expenditure incurred in the different districts during the survey year under report, inclusive of shares of cost of control and of the 4 per cent. charge for instruments:—

Division.	District.	Traverse survey.	Cadastral Survey.		Topographical survey.	Total.
			Detail survey.	Record writing.		
1	2	3	4	5	6	7
	Temporarily-settled and Government Estates.	Rs.	Rs.	Rs.	Rs.	Rs.
	Major Settlements.					
Bhagalpur ...	Sonthal Parganas (Damin-i-koh Government Estate).	28,621	...	...	...	28,621
	Private Estates.					
	Major Settlements.					
Dacca ...	Backergunge	349	...	...	...	349
Bhagalpur ...	Sonthal-Parganas (Private Estates).	(a)2,778	...	...	...	2,778
	Monghyr	29,643	...	...	...	29,643
Patna ...	Saran	(b)114	10,529	23,260	1,065	34,968
	Darbhanga	(c)3,988	(d)96,964	(e)1,15,937	...	2,16,889
	Muzaffarpur	...	124	34	...	158
	Champaran	...	...	...	1,076	1,076
	Darbhanga (revision) ...	...	...	200	...	(f)200
	Miscellaneous.					
Patna ...	Saran (Chapra City) ...	...	1,034	160	...	1,194
	Darbhanga (Darbhanga City)	...	2,969	1,136	...	4,105
	Patna (Diara villages) ...	...	91	97	...	(g)188
	Do. (Diara Topo.) ...	...	...	...	307	(g)307
	Shahabad Dumraon Raj Ballia Dispute ...	...	235	...	...	(h)235
	Ditto (Diara villages) ...	...	400	230	...	(h)630
	Ditto (Diara Topo.) ...	...	...	...	427	(i)427
	Ditto (Semri and Lakhan Dehra Estate.	54	...	...	...	(h)54
	Ditto (Arrah Town) ...	192	...	...	...	(j)192
	Ditto (Kachuar Mahal)	313	...	...	...	(i)313
	Saran-Ballia (Diara Topo.) ...	...	...	...	208	208
	Saran-Patna (Diara) ...	536	...	...	...	(i)536
Bhagalpur ...	Nepal Frontier (re-demarcation.	851	...	...	...	(k)851
	Monghyr Binda Diara Government Estate Banaili Raj.	409	...	...	...	(l)409
Chittagong ...	Noakhali	6,839	...	...	...(m)	6,839
Benares ...	Ballia (Mauza Jauhi Dumraon Raj).	347	781	633	...	(h)1,761
Orissa ...	Cuttack (Revision of 2 inch survey Kachila Nawagaon.	...	...	...	656	656
Bengal Drawing Office.	Bihar (badars)	...	1,721	...	...	1,721
	Orissa Khurda (badars) ...	...	15,607	...	...	15,607
	Total ...	75,034	1,30,455	1,41,687	3,739	3,50,915

(a) Includes Rs. 785 traverse arrears.
(b) Arrears traversing
(c) Includes Rs. 2,534 cost of re-traverse in thanas Benipatti, Khajauli and Phulparas.
(d) Includes Rs. 13,449 arrears—area extraction, traces, &c.
(e) Includes Rs. 22,810 arrears and Rs. 4,277 cost of Badar establishment employed in the field.
(f) This expenditure has been incurred on the revision of the khanapuri of Babu Goneshwar Pershad Singh's villages to be met by the zamindar.
(g) Expenditure met by the Collector of Patna.
(h) Expenditure met by the Dumraon Raj.
(i) Debitable to Bihar grant.
(j) Expenditure met by Collector of Shahabad.
(k) Debitable to Bengal Government under head of "Political."
(l) Expenditure met from the Bihar grant.
(m) Cost of topographical survey included in traverse expenditure.

General Principle.

8. The general procedure which has been in vogue during the last eight seasons has in no way been changed during season 1899-1900.

Attendance of raiyats.

9. There has been an improvement in this respect during the past year, which is mainly due to the use of the new non-attendance forms referred to by Captain C. W. H. Symonds, in paragraph 9 of last year's Annual Report.

In one cadastral section alone there was a reduction in the preliminary non-attendance notices of over 4,000 on the numbers of the previous season. Fewer process-fee notices were also issued.

10. There has been no alteration in the procedure laid down in paragraphs 10, 11, 12, 13, 18, 20, 23, 26 of Captain R. T. Crichton's Annual Report for 1897-98.

Temporary demarcation of boundaries.

11. The temporary demarcation, by means of stakes and earthen mounds at each bend of village boundaries, was, on the whole, satisfactory. The demarcation notices were distributed by the Collectors in the usual way through the village chaukidars to the villagers concerned.

Permanent marking of villages.

12. Each village trijunction was marked by a triangular stone prism, these prisms being obtained from the Bengal Stone Company. All the intermediate theodolite stations situated on land not subject to riverain action were marked by baked clay cylinders obtained locally. In diara lands and along boundaries under dispute only wooden or bamboo pegs were used to mark the theodolite stations.

Maintenance of permanent marks.

13. In thanas Benipatti and Khajauli, district Darbhanga, which came under cadastral survey during this season, it was found that a very large percentage of the traverse stations laid down in seasons 1893-94 and 1895-96 had disappeared, thereby necessitating the employment of eleven sub-surveyors for a considerable period to re-lay the lost stations much delaying the commencement of the detail survey. This bears out the remarks made by Captain R. T. Crichton, in paragraph 17 of his Annual Report for 1897-98 regarding the difficulty of ensuring the preservation for any length of time of permanent marks.

Unit of Cadastral Survey.

14. The "field or survey number" as defined in paragraph 19 of the Annual Report for 1897-98 has been the unit of cadastral survey.

Scale of Survey.

15. The cadastral survey of all villages in Bihar was on the scale of 16 inches = 1 mile.

Village sites have been surveyed on the scale of 64 inches = 1 mile; insufficient space on the margin of the 16-inch sheets for the survey of the village site on the large scale has necessitated the use of 954 extra sheets.

The topographical survey of certain "chars" in district Noakhali was commenced on the scale of 16 inches = 1 mile, but on the Collector of that district representing that a topographical survey of the ground lying between the traverse polygon lines and the water's edge, was only required, the remaining "chars" were surveyed on the scale of 4 inches = 1 mile.

Chcraut system of survey.

16. In the Darbhanga district there were only six large villages, comprising 67,305 plots, where it was found necessary to adopt this system of survey and khanapuri. This method is fully explained in paragraph 25 of the Annual Report for 1897-98.

Boundary Disputes.

17. The number of these disputes in the Darbhanga district have been fairly numerous; all have, however, been disposed of with the exception of those lying in thana Khajauli. These will be dealt with next field season, no Settlement Officer having been available for this work in the latter area at the time.

A slight change has been made with reference to the supply of traces of disputed village boundaries. Hitherto, only one dispute record and trace has been supplied to the settlement; as, however, each dispute affects two villages and possibly more, the Settlement Officer, North Bihar, requested us to furnish in future a separate trace and dispute report for each affected village to enable him to complete the "nathis" of such villages.

Supply of Records to the Settlement Department.

18. The procedure of forwarding all completed records in batches to the Settlement Officer, in force during the past two seasons, has been adhered to.

All the records, traces, etc., of the past field season's work in Darbhanga have been despatched to the Settlement Department.

Bengal Badar Establishment.

19. The procedure introduced by Captain Crichton in season 1897-98, which arranged for the badars of the previous season's work being dealt with by small establishments in each of the cadastral sections, worked most satisfactorily. These two camps dealt with attestation badars in an area of 1,232 square miles, comprising 1,982 villages and containing 22,88,715 fields. In this area badars were only submitted for 1,147 villages, affecting 8,510 plots, which gives a percentage of ·45 on the entire season's work.

At a Conference held at Darbhanga on the 9th April 1900, it was resolved that, in addition to the above attestation badars, all section 103A., namely, "case" badars should be dealt with by the badar establishments of the cadastral sections, and not, as hitherto, by the Bengal Drawing Office. The result of this change was that, from the 1st May last, the strength of the Bihar badar establishment of the latter office was reduced from eight to two estimators.

Correct spelling of village names on the Standard Sheets.

20. At a Conference held at Darbhanga on the 9th April 1900, the question of the preparation of lists of village names, correctly spelt, was considered. It was decided that, as hitherto, the attestation officers should make necessary enquiries on this point and at the close of the attestation proceedings, complete lists showing the correct village names in Hindi and English for the whole area attested should be prepared by the Settlement Officer and sent to the cadastral camps as soon as possible. The camp officers were then, from the lists, to enter the village names in English on the original sheets and also check and correct the spelling of the Hindi names on the sheets. The original maps, together with the Settlement Officer's lists, are then to be forwarded to the Bengal Drawing Office when a final comparison of the English names, as entered on the standard sheets, is to be made.

Disputed Entries.

21. These have been dealt with by five kanungos, two of whom were appointed to Camp II, and three to Camp III. In the former camp there were 21,120 disputes affecting entries in the records; of these 20,815 have been enquired into and settled by the kanungos, the balance of 305 still remain to be dealt with. In Camp III there were 2,114 disputes affecting 53,107 fields, all of which have been settled by the above agency.

Training of Junior Civilians.

22. The following Junior Civilians were, during the past season, instructed in the use of the theodolite and also put through a short course of

training in survey and record-writing on the lines laid down by Captain R. T. Crichton and Mr. Stevenson-Moore.

Messrs. Barniville, Mudiman, Bradley-Birt, Crump, Gabriel, Ross, Watson, Vas, Birley, Botham, Dentith, Monahan, Roy, Bentinck, Payne, Edwards and Reid.

Copies of Maps and Records.

23. In the Darbhanga district Rs. 4,087-12 were deposited by zamindars and others in payment for copies of maps and records. Of this amount Rs. 3,510-8-5 were paid to copyists and the balance Rs. 877-3-7, representing the cost of tracing cloth, forms, and Government fees, was credited to Government.

Chainmen and Menials.

24. No free labour has been supplied in any of the districts under survey in Bengal during the past field season. In Bihar, in addition to the one chainman on a fixed pay of Rs. 4 per mensem allowed each amin, every amin was provided with three coolies for the period of survey only; these coolies received 1½ annas each per diem.

In district Noakhali considerably higher rates had to be paid for labour; the coolies employed during the topographical survey of the "chars" received pay at the rate of Rs. 10 per mensem.

Suppression of raiyats.

25. As a large portion of the area under survey in Darbhanga belonged to the Raj, there were fewer cases of suppression than in previous seasons. In thanas Benipatti and Khajauli of district Darbhanga, however, owing to suspicions that the raiyats were being suppressed, the Settlement Officer arranged that in all cases where there was any doubt as to the malik's claim to the land, such blocks should be surveyed "kittawar," and a list and trace map made of the same. This had to be done in 152 villages affecting 9,764 blocks; of this number the kanungos have enquired into and settled 1340.

Powers of officers under the Survey Act.

26. Messrs. H. Dowman and A. W. Smart were gazetted as Assistant Superintendents of Survey under the Survey Act [Act V (B.C.) of 1875], in Monghyr and Darbhanga districts, respectively.

27. The subjoined statement shows the amounts realized in fines and process fees:—

District	Amount by fines.	Amount by process fees.
	Rs.	Rs.
Darbhanga	835	849
Monghyr	...	...
Sonthal Parganas	...	...
Total	835	849

The above amounts, though slightly in excess of the figures given in last year's annual report, on the whole compare favourably.

Attitude of the inhabitants.

28. In the Darbhanga district, there was an improvement on previous seasons in the attitude of the inhabitants towards the survey operations, more interest being taken in both the survey and khanapuri stages; the attendance was also better.

As in the past field season, considerable opposition was offered by the inhabitants of the Sonthal Parganas. This obstruction did not so much take the form of uprooting theodolite stations, as mentioned in last year's report, but was rather due to boundary disputes between the Sonthali and Paharia

villagers, the latter frequently refusing to allow the surveyors to traverse the disputed boundaries. A certain amount of obstruction was also met with in the traverse and topographical survey in district Noakhali, where much difficulty was experienced in obtaining boats for the survey of the "chars."

Nature of tenures.

29. In thana Benipatti, the tenures were principally "pattidari," and far more intricate than those met with in thana Phulparas. The subjoined statement shows the different kinds of tenure dealt with in district Darbhanga during the past field season :—

	Pattidari.	Ijmali.	Wahid zamindari.
Number of villages in thana Benipatti ...	174	..	98
Number of villages in thana Phulparas ...	51	51	235
Total ...	225	51	333

Recess quarters.

30. As in previous years, the head-quarters of the Bihar survey and the Bihar traverse section recessed at Mussoorie. The Darbhanga cadastral sections recessed at Bhagalpur instead of at Digha. This change was due to the outbreak of plague at the latter station, and it being considered inadvisable by the Commissioner of Patna, that a large native cadastral establishment should be brought into a plague-infected place.

This move is an advantageous one now that the *locale* of the survey operations in Bihar is moving further east each season.

Agreements with Amins.

31. Stamped agreements were, as in past seasons, taken from all Inspectors and amins. Only one man absconded and none had to be proscribed.

Class of amins employed.

32. From the following statement will be seen the number of amins employed under the heads "Local" and "Foreign" in the Darbhanga Cadastral Camps.

District.	Local.	Foreign.
Darbhanga	265	212

The following is the average daily outturn in survey and khanapuri in Cadastral Camp II.

SURVEY.

	Acres.
Local amins per diem	20
Foreign „	22

KHANAPURI.

	No.
Local amins per diem	69
Foreign „	65

In Cadastral Camp III

SURVEY.

	Acres.
Local amins per diem	16
Foreign „	18

KHANAPURI.

	No.
Local amins per diem	70
Foreign „	57

Office of the Superintendent.

33. Captain C. W. H. Symonds during the field season had one clerk with him on tour, the "Controlling Office" remaining as usual at Digha.

Major G. B. Hodgson during his tour of inspection in July and August last was accompanied by one clerk.

During the short periods I held charge, the entire office establishment worked well. Ramji Lal, Head Clerk, and Raghubir Saran, Head Accountant, are deserving of special mention; they both assisted me in every possible way.

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND ON RECORDS OF RIGHTS IN TEMPORARILY-SETTLED TRACTS AND GOVERNMENT ESTATES UNDER SETTLEMENT OF RENTS AND LAND REVENUE.

MAJOR SETTLEMENTS.

DISTRICT SONTHAL PARGANAS.

Traverse.

PRELIMINARY REMARKS.

34. The work performed by the Sonthal Parganas detachment during season 1899-1900 consisted of the Government estate of the Damin-i-Koh and sundry scattered private estates. Applications for the settlement of rents in the latter were filed during the recess season 1898-99, and, at the request of Mr. H. McPherson, Settlement Officer, the traverse of these private estates was taken up in addition to the original programme of 639 square miles in the Damin-i-Koh.

As the expenditure for the Government and private estates has been kept separate, the two surveys will be dealt with similarly in this report.

The establishment for carrying out this traverse survey consisted of—

Mr. E. F. Berkeley, Extra Assistant Superintendent (in charge), one writer and accountant, 19 sub-surveyors, 15 computers and draftsmen and the usual complement of guardmen, tindals, etc.

The detachment took the field on the 20th October 1899, and the office re-opened in recess at Dumka on the 1st June 1900.

The country throughout is very hilly, with small plateaux here and there, the cultivation lying in the valleys and on these plateaux.

The villages are of two kinds :—

(*a*) Those known as Sonthali and inhabited by Sonthals and are under assessment of the land revenue.

(*b*) Those known as Paharia and inhabited by the aborigines of the Sonthal Parganas. These being gradually driven out by the Sonthals, were forced to take refuge in the most hilly portions of the district, where they eventually settled. Their villages have never been assessed.

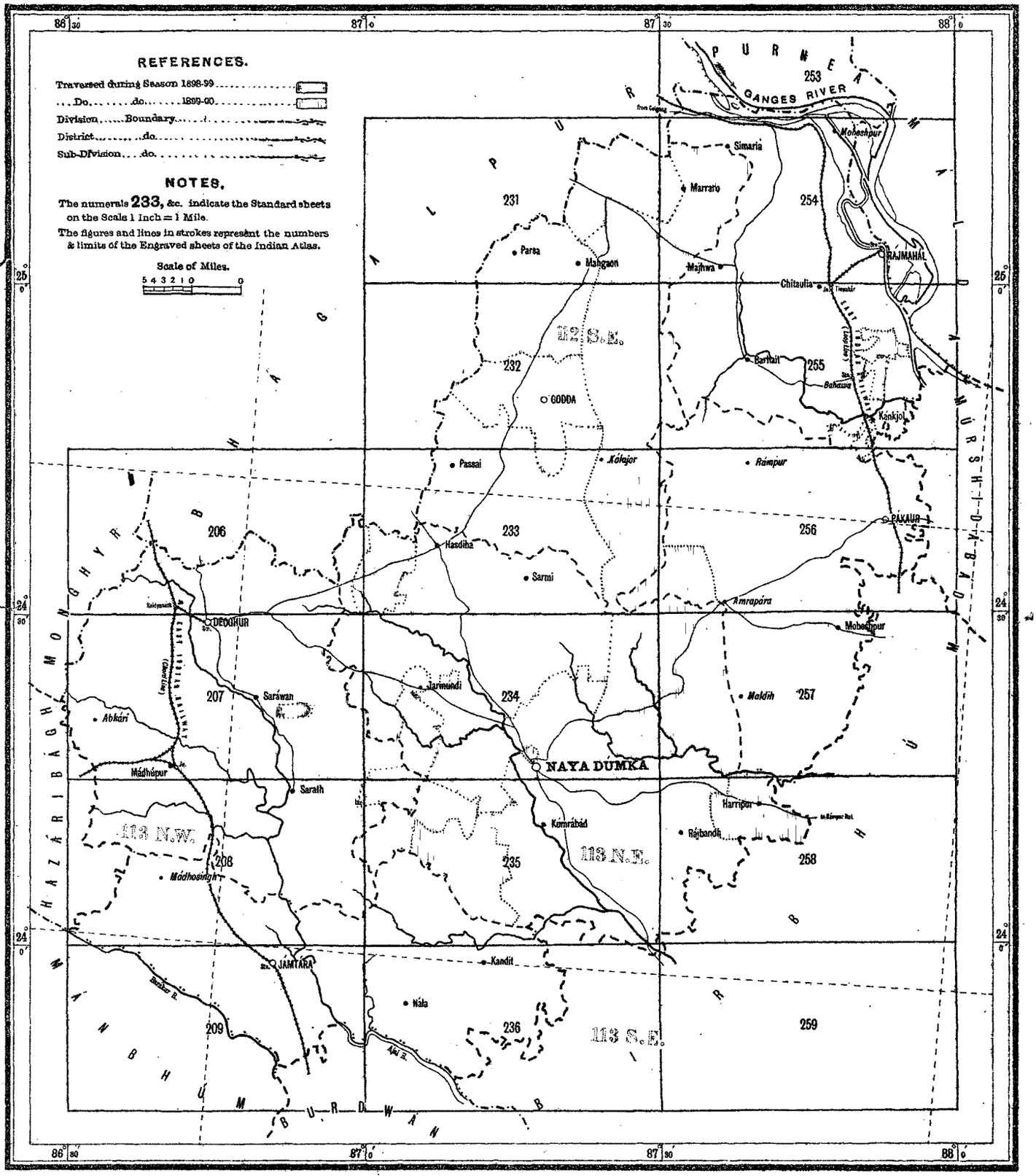
The Sonthalis, who are more civilized than the Paharias, raised no serious objections to the survey operations, and, where they did not actually assists were only apathetic. They, however, showed a great inclination, whenever opportunity offered, to encroach on the Paharia villages.

The Paharias, on the other hand, thinking that their villages were to be at last assessed, and probably being unable to grasp the exact reason for "disputed lands," due to the encroachment of the Sonthals, being surveyed separately, offered most active obstruction to the survey operations. Although every such case was reported to the Subdivisional Officer concerned, who invariably held an enquiry and endeavoured to make the delinquents understand the nature of the operations, in spite of all promises made to him at the time, they steadily refused to allow the sub-surveyors to enter their villages. At length, when the work was being seriously delayed, on consultation with

BENGAL SURVEY.

INDEX TO THE TRAVERSE SURVEY IN DISTRICT SONTHAL PARGANAS.

1899-1900. DETACHMENT.



Reg. No. 618 Bengal.—Jan 01.—650.

Photo, S. I. O., Calcutta.

Mr. H. McPherson, it was agreed to enclose the Paharia villages in blocks where they would not allow them to be traversed separately. Complaints of obstruction diminished considerably after the issue of this order to the sub-surveyors.

The majority of the khalasis were recruited from Hazaribagh. They again proved a failure, a number absconding every month, and one and all refusing to serve after April. They were only induced to remain on till the completion of the field season by the raising of their pay eight annas.

For the coming season it is proposed to recruit as many men as possible through the sub-surveyors, who will have more or less of a hold on them. The remainder will have to be recruited from Hazaribagh as the Sonthal is useless as a khalasi.

Mr. Berkeley reports the health of the establishment as having been very indifferent. The chief complaints were fever and dysentery. Among the khalasis four deaths occurred and many others had to be invalided and sent to their homes. The subjoined statement gives the number of sub-surveyors employed and the number that were sick monthly during the season.

Months.	Number of sub-surveyors employed.	Number of sub-surveyors ill.	Number of days of sickness.	Remarks.
1	2	3	4	5
November 1899 ..	18	7	63	
December „ ...	16	16	96	*Average number of sub-surveyors. 17
January 1900 ...	17	9	73	
February „ ...	19	10	44	
March „ ...	17	8	64	
April „ ...	17	11	77	Average number of sick monthly. 10
May „ ...	15	9	49	
Total	119*	70*	566	

The above table gives some idea to what extent the work was hindered by sickness. The detachment practically lost the services of more than half its sub-surveyors for a quarter of the field season.

As the most unhealthy portion of the Damin-i-Koh still remains for survey, arrangements have been made that a Hospital Assistant shall be attached to the detachment during the coming field season.

The demarcation of villages by means of earthen mounds at salient points of boundaries was again carried out, under instructions from the Deputy Commissioner, by the "parganites" or headmen of villages. It was on the whole satisfactory.

The station marks were the same as used in the previous season, namely, stone prisms at village trijunctions, baked clay cylinders at the intermediate theodolite stations and pegs along the disputed obundaries.

There has never been a village survey in the Damin-i-Koh, with the exception of a rough one made by kanungos. At the time of the last settlement in 1878-79 certain villages were formed, a list of which was obtained from the Settlement Officer and given to the sub-surveyors as a guide in their work. No lists of Paharia villages were available.

Two chains, one an ordinary Gunter of 100 links and the other a 93-link chain, were again used on all main and sub-circuit traverses. A single chain was used on village circuits. Each sub-surveyor was provided with two spare chains, one of which was sent in alternately every week to be checked against the standard laid down in the head camp, the other being used by him as his "partal" chain, against which the surveyor tested his "running" chain daily. Angles of depression and elevation were always taken on slopes with the ordinary wooden clinometer. Notwithstanding these precautions, a few village "sets-up" had to be passed, although containing over the percentage of error allowed. This over percentage of error is entirely due to the hilly nature of the country.

Line clearing squads were sent out some time ahead of the surveyors, and this work was always well in advance of the traverse. The officer in charge reports, however, that there were frequent complaints from the surveyors as to the indifferent manner in which the clearing was done. The line-cutting tindals were chiefly from Hazaribagh, and Mr. Berkeley considers they are unsuited for the work, and hopes next season to obtain the services of more experienced men.

The origin of the survey was the same as last year, *i.e.*, the intersection of North Latitude 24°-30′-00″ and East Longitude 87°-30′-00″. The correction applied to the angular work was + 1′ on every eleven angles and —1′ on every 15 angles. That applied to the chaining on main circuits was as follows:—

When the northing is	+ 0·42	links per	100 chains.
Ditto southing is	+ 3·10	do.	do.
Ditto easting is	+ 0·00	do.	do.
Ditto westing is	+ 2·96	do.	do.

As a rule the villages all passed within the 10 per cent. error allowed.

The angular correction laid down in the traverse rules was not exceeded.

The magnetic variation of the needle, as derived from the mean of all the observations for Azimuth, is 2°-04′ east of the true meridian. As there were no Great Trigonometrical stations in the immediate vicinity of the Damin-i-Koh, and it was not considered advisable to run a series of minor triangulation connecting the North Maluncha series with the Calcutta meridional series, no connections have been made. The co-ordinates on the main and sub-circuits have been applied from last year's work and the resulting error in feet per mile, as deduced from the triangulated and traversed distances, cannot be computed. The main circuits of this season's operations have, however, all passed within the percentage allowed.

A connection was made from one of the main circuits of the private estates' area to Satbar hill station No. III in the Maluncha series of the Great Trigonometrical Survey and the error in feet per mile, as derived from the triangulated and traversed distances from Phuljari Hill station No. 1, which had been connected with in season 1898-99, is 1·26 feet.

The 16″ plots for the private estates were all supplied to the Settlement Officer during the field season, those of the Damin-i-Koh will be handed over in October 1900.

My remarks on the services of officers will be found in paragraph 54 of this report.

The services of the following members of the native establishment are deserving of special mention:—

Krishnaji Mahadeo Raj, head computer; Lalji Sahai, writer and accountant; Azimuddin, sub-surveyor; computers Arjun Pershad, Govind Pershad and Kurban Ali are also deserving of mention.

Damin-i-Koh.

35. The traverse survey of the Government estate was sanctioned by the Government of India in their telegram No. 2233, dated 30th September 1899, to the Government of Bengal, intimating, however, that the cost of the survey could not be borne by Imperial revenues.

The cost, estimated at Rs. 50,000 and to be met from Provincial funds, was sanctioned in the Government of Bengal, Revenue Department, Land Revenue Branch Order No. 3620 and 3622, dated 6th October 1899, to be distributed equally over the financial years 1899-1900 and 1900-1901.

The area known as the Damin-i-Koh extends over the subdivisions of Dumka, Godda, Pakour and Rajmahal. As the same language is not spoken in all these subdivisions, at the request of the Settlement Officer, who had more Hindi than Bengali amins, it was decided to take up the Dumka and Godda subdivisions, in which the Hindi language was supposed to predominate. From a surveyor's point of view, it would have been preferable, in order to obtain symmetrical main circuits, to have divided the estate into equal portions.

As the combined area of the two abovementioned subdivisions fell short by a few square miles of the area of half the estate, a small portion to the south-west of the Pakour subdivision and conterminous to the other two was included in the season's operations.

There were altogether four main circuits, one of which followed the subdivision boundary, the other three subdivisional and taluk boundaries, where possible, otherwise village boundaries along some natural feature of the country. The main circuits were again divided into 22 sub-circuits, all of which followed village boundaries along natural features. There was some difficulty experienced in marking out these sub-circuits owing to the non-existence of any boundaries on the map.

Mr. Berkeley states he would have liked to have followed "banglow" jurisdictions as the limits of sub-circuits, but having no means of telling what shapes or sizes they would assume, he decided to carry them along natural features, keeping them as symmetrical as possible. In doing so, he proved to be right, as the "banglow" jurisdictions turned out most unsuitable for sub-circuits.

The subjoined tabulated statement shows the extent of the operations :—

Number of main circuits.	Name of subdivision.	Number of villages.	Number of blocks.	Area in square miles.
1	2	3	4	5
No. 5	Godda ...	243	5	107·82
„ 6	„ ...	175	2	146·11
„ 7	„ ...	139	2	121·16
	Pakour ...	35	...	33·25
„ 8	Dumka ...	328	3	216·07
	Total ...	920	12	624·41

There were 514 sub-traverses run at the usual distance apart.

The theodolite was set up at 21,823 stations, or, excluding commencing and closing points, at 18,861 stations. Of these 1,728 were trijunction points and marked by stones obtained from the Bengal Stone Company, 873 by baked clay cylinders procured locally and 16,260 stations by wooden pegs.

Azimuths to East and West stars were observed at 120 stations, giving an average of 28 stations between azimuth points.

During the season's operations 2,348·5 linear miles of new chaining was run as follows :—

	Miles.
On main circuits	219·9
„ sub-circuits	175 8
„ pardahs	143·9
„ villages	1,343·0
„ sub-traverses	465·9
Total ...	2,348·5

The total cost on this portion of the work amounts to Rs. 28;621 which gives an incidence of Rs. 45·86 per square mile; of this Rs. 2·30 per square mile is debitable to stone embedding.

PRIVATE ESTATES.

36. In addition to the private estates completed during season 1898-99 certain others were notified for resettlement, these are given in the following statement:—

Subdivision.	Taluks.	Number of villages.	Area in square miles.	Number and date of notifications.
1	2	3	4	5
Dumka ...	Sap Challa ...	90	24·15	Notification No. 1416L.R., dated 20th March 1900.
Do. ...	Tesuria ...			
Do. ...	Amgachi ...			
Do. ...	Nankar ...	77	55·5	Notification No. 1417L.R., dated 20th March 1900.
Do. ...	Ghat Rasickpur ...			
Raj Mahal ...	Mansa Chandi ...			
Ditto ...	Mianpur ...			
	Total ...	167(a)	79·20(a)	

(a) These figures are only approximate.

The traverse survey of the above estates was sanctioned, provided the expenditure was met from the allotment made for the private estates for the financial year 1899-1900.

The largest portion of the private estates lie to the south of the Dumka Damin, to which it is connected; the second largest is south of, and connected with, last year's main circuit No. 1. Ghat Rasickpur is only a short distance from main circuit No. 1, to which it has been joined by connecting lines; the same applies to Mainpur and Mansa Chandi, which are scattered portions to the North of Mohabatpur surveyed last season.

The following statement shows the outturn of work:—

Subdivisions.	Taluks.	Number of villages.	Area in square miles.
1	2	3	4
Dumka ...	Nankar	73	45·20
Do. ...	Sap Challa	49	29·33
Do. ...	Tesuria	35	21·98
Do. ...	Amgachi	7	8·84
Do. ...	Ghat Rasickpur ...	7	2·81
Raj Mahal ...	Mansa Chandi ...	17	5·91
Ditto ...	Mianpur		
	Total ...	188	114·07(a)

(a) This is exclusive of 20·33 square miles not traversed in detail.

The above villages are contained in two main circuits and two outer portions connected to main circuits.

In the villages there are 138 sub-traverses at the usual distance of thirty to forty chains apart. The new theodolite stations number 3,185 of which 394 are marked by stones and 2,791 by pegs. The actual number of stations at which the theodolite was set up is 3,845. Azimuths were observed at 35 stations, that is to say the angular work was checked by an astronomical

observation at every 28 angles. There were 505·2 linear miles of new chaining distributed as follows:—

	Miles.
On Main circuits	76·1
„ Sub-circuits	34·4
„ Connecting lines	19·4
„ Village	254·1
„ Sub-traverses	121·2

The total expenditure on private estates during the survey year amounts to Rs. 2,778, which gives a cost rate of Rs. 20·58 per square mile. This includes certain sums spent on the completion of last season's records and stone embedding. The whole amount has been debited to financial year 1899-1900.

PART II.—REPORTS ON SURVEYS AND ON RECORDS OF RIGHTS IN PRIVATE ESTATES.

MAJOR SETTLEMENTS.

MONGHYR DISTRICT.

Traverse Survey.

37. The traverse programme in Darbhanga having been completed last season, the North Bihar traverse section moved into the Monghyr district for the survey of thanas Tegra and Beguserai, taking the field at Tegra on the 28th October 1899.

The strength of the section was as follows:—

Mr. H. Dowman, in charge.
23 Sub-surveyors.
16 computers, draftsmen, &c.
324 menials, including guardmen, line-cutters, chainmen and khalasis.

Mr. Dowman was in charge of the section during the whole of the field season, when he availed himself of privilege leave, from the 1st May to 16th July 1900. During his absence Captain A. Mears supervised the recess work; on his return from leave Mr. Dowman again assumed charge of the section. Mr. T. W. Babonau was attached to the traverse section for the greater portion of the recess season.

Area traversed during the season.

The subjoined tabular statement gives the number of villages and area traversed.

The diara lands lying in both thanas have been omitted from survey; the traverse of this tract will be taken up in season 1900-1901.

THANAS.	Parganas.	Number of villages.	Area in Square miles.	REMARKS.
1	2	3	4	5
Tegra ...	Various.	493	153·91	
Begusarai ...		566	387·54	
Total ...		1,059	541·45	

The origin of survey adopted in district Monghyr is the inter-section of North Latitude 25°-30′-00″ and East Longitude 86°-30′-00″.

The entire area surveyed is contained in three main circuits; these again were sub-divided into 33 sub-circuits.

. Each sub-circuit, the average area of which is 16·41 square miles, contains 32 villages, sub-divided again by 23 sub-traverses.

As usual, on both main and sub-circuit traverses, two chains of unequal lengths were used, one an ordinary Gunter's chain of 100 links and the other a Gunter's chain with 7 links abstracted therefrom. By means of a conversion table the surveyor is enabled to compare these two independent measurements, and to detect any errors in the chaining at once; in cases of discrepancy the distances are immediately re-chained. Only one Gunter's chain (100 links) is used on the village circuits and sub-traverses. To further ensure the accuracy of all chaining, each surveyor's squad is supplied with two standard chains against which he checks his running chain daily. The standard chains are sent in alternately once a week to the traverse section head camp to be tested against the standard laid down there by means of the standard steel bars. All chains before being handed over to the surveyors are checked against the camp standard.

During the season 2,223·15 linear miles of new chaining were run, and are distributed as follows :—

	Linear miles.
Main circuits	167·96
Sub-circuits	229·44
Village circuits	978·10
Sub traverses	847·65
Total ...	2,223·15

The corrections applied to each 100 links were as follows :—

		Links.
When the northing was	+	3·59
Ditto southing „	+	1·74
Ditto easting „	+	3·08
Ditto westing „	+	3·08

These figures are low, and I think prove that great care was taken to ensure accurate chain measurements.

To check the accuracy of the angular work, 93 azimuths were observed to east and west stars at an average of 25 stations apart; in addition to these 93 azimuths a large number of those observed in district Darbhanga were utilized after applying the necessaary change in convergency to suit the new origin. These checks proved the angular work to be satisfactory. The average correction applied to the work is +1′ in 45 angles and —1′ in 68 angles on the new work and + 1′ in 28 angles and — 1′ in 35 angles on the entire polygon.

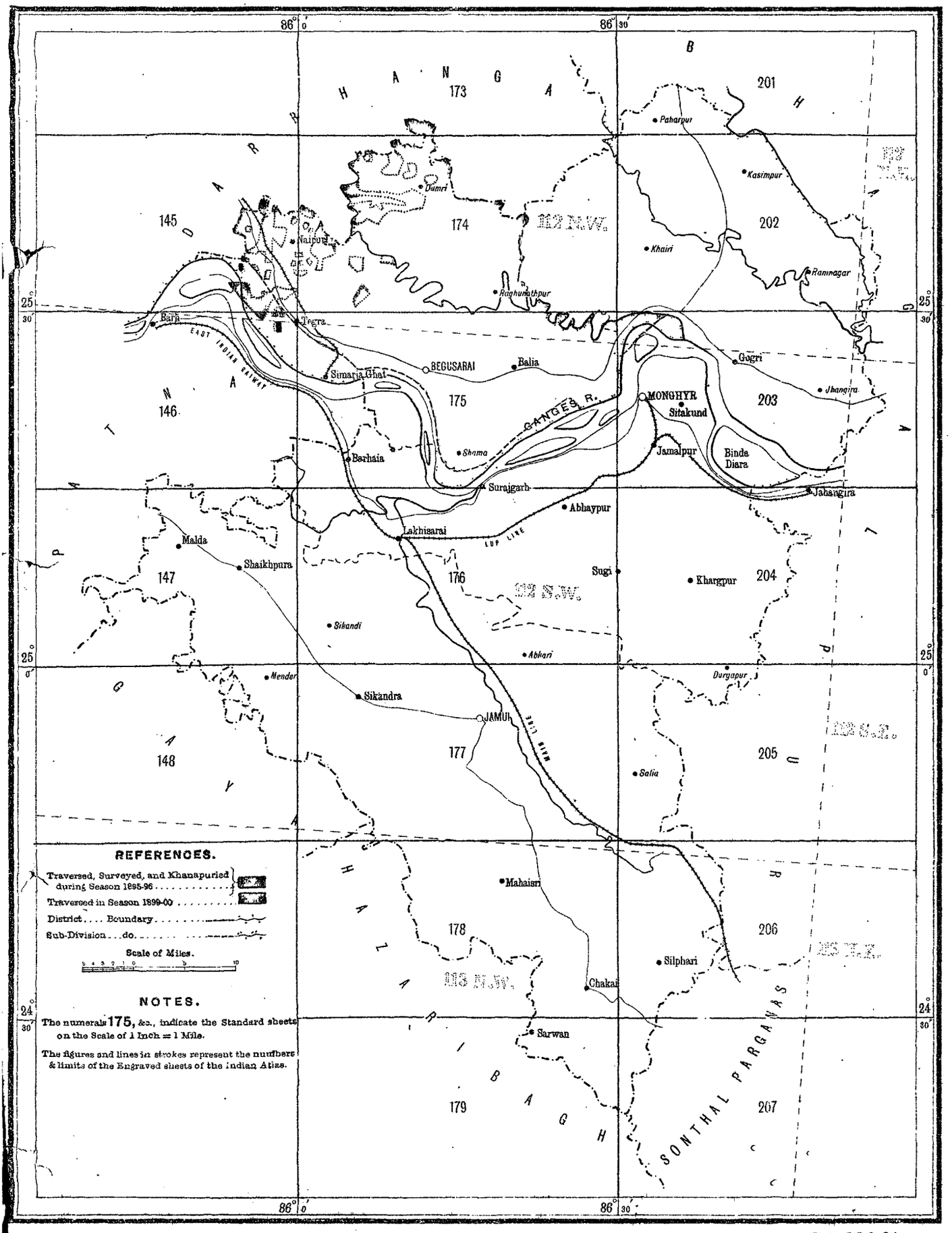
The mean variation of the magnetic needle, calculated from the results of the 93 new azimuths, is 2° —02′ east of the true meridian. Five Great Trigonometrical Survey stations fell within the area of the season's operations; connections were only made with four, the fifth station, Bandwar, having been washed away by the river Bur Gundak. The results computed from the three direct distances are given below :—

From station.	To station.	Distance by triangulation.	Distance by traverse.	Difference.	Error per mile in feet.
1	2	3	4	5	6
Dihi ...	Akaha ...	46,567·4	46,467·7	99·7	11·4
Akaha ...	Malti ...	50,455·9	50,410·2	45·7	4·8
Malti ...	Motihani ...	58,931·3	58,878·3	53·0	4·8

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT MONGHYR.

1899-1900. Nos. 4 & 5 PARTIES.



REFERENCES.

Traversed, Surveyed, and Khanapuried during Season 1895-96 .....

Traversed in Season 1899-00 .....

District.... Boundary .....

Sub-Division...do. .....

Scale of Miles.

NOTES.

The numerals **175**, &c., indicate the Standard sheets on the Scale of 1 Inch = 1 Mile.

The figures and lines in strokes represent the numbers & limits of the Engraved sheets of the Indian Atlas.

Reg. No. 613, Bengal.—Jan. 01.—650.

Photo. S. I. O. Calcutta.

The rectangular co-ordinates used on the main and sub-circuits were derived from the means of the spherical co-ordinates of districts Darbhanga and Mongyhr deduced from their respective origins.

During the season 12,250 new stations were embedded. Of these, 896 were on main circuits, 1,43[illegible] on sub-circuits, 6,476 on village circuits and 3,446 on sub-traverses.

Of the marks used, 1,354 were stones, 10,499 clay cylinders and 397 wooden pegs.

Stones were only employed for marking village triple-junctions, cylinders along village boundaries and pegs on such boundaries as were under disputes.

Including "Shuru" and "Milan" angles, the theodolite was set-up 15,906 times.

The preliminary demarcation, carried out by the villagers concerned, in accordance with the notices served on them through the Collector of the district, was found to be satisfactory.

There were 54 cases of disputed boundaries. In such cases both lines were traversed and plots furnished to the Settlement authorities showing the disputed areas.

The health of the establishment was good, only a few cases of fever occurring during the season.

The sub-surveyors and line-cutters were as usual furnished with traces from the 4″ Revenue Survey volumes.

The officer in charge reports that the villagers afforded every assistance to the line-clearers and surveyors, and that he found it unnecessary to inflict any fines or issue any process fee notices.

The 4″ traces of the plots of main circuits 1, 2 and 3 were forwarded to the cadastral camp on the 27th July 1900.

The 16″ plots of Main circuit No. 1 on 13th August 1900.
Ditto ditto No. 2 on 28th „ „
Ditto ditto No. 3 on 14th September 1900.

The traverse computations have also been completed and there are no arrears of work of any description. Mr. Dowman and his computing establishment deserve credit for this.

In the Monghyr and Noakhali districts the sum deposited for copies of records by zamindars and others amounted to Rs. 193-11. Of this sum Rs. 168-8 was paid to copyists, Rs. 3 was paid for court-fee stamps and postage, and the balance Rs. 22-3 credited to Government.

The services of the officer in charge of this section and his assistant are alluded to in paragraph 54 of this report.

Of the native establishment head computer, Lalmohana Gangapadhyaya, is deserving of special mention. Mr. Dowman reports most highly on his zeal and ability in the discharge of his duties. The following members of the establishment are also deserving of mention—Computers Dharnidar Mukherji, Jogendra Chandra Ghosal, Manohar Daji and Gopal Sitaram; surveyors, Kundan Lal and Mayadhari; Persian writer Mathura Pershad.

The total expenditure on traverse survey in Monghyr district is Rs. 29,643, which gives an incidence of Rs. 54·69 per square mile. This includes the cost of marking of stations.

The following reasons will account for this high rate.

(*a*) The original traverse programme, consisting of the "up-lands" in thanas Tegra and Begusarai, was a comparatively small one and was further reduced by the "upland" area proving to be less than expected, due to the diara area of these thanas, which was not for survey till the following season, having been under-estimated. The cost of the supervising and computing establishments of the section have been in consequence distributed over a small area, thereby enhancing the rates.

(*b*) For a portion of the recess season the pay of both Captain A. Mears and Mr. T. W. Babonau was debited against this section, which added to the cost rates.

(*c*) Heavy shares of the "controlling office" due to reduction of the programme in other parts of Bengal.

Darbhanga District.

(THANAS BENIPATTI AND KHAJAULI.)

Cadastral Survey with Records.

38. The Saran Cadastral Section on the completion of the work in that district was transferred to district Darbhanga.

The establishment is as follows:—

Mr. A. W. Smart, Extra Assistant Superintendent, 5th grade, in charge.
Mr. C. S. Gasper.
Mr. H. H. B. Hanby.
Mr. P. L. Causley.

Native Establishment.

3 Head Inspectors.
20 Inspectors.
149 Foreign amins.
78 Local ,,
203 Muharrirs.
332 Mirdhas.
27 Accountants, draftsmen, writers, computers, tindals, etc.

The original programme consisted of the villages lying in thanas Benipatti and Khajauli situated in the extreme north of the district. This programme was reduced by the exclusion of the Rajnagar villages of the Darbhanga Raj, and subsequently further curtailed by omitting khanapuri in all the villages of thana Khajauli. This latter reduction was, I understand, due to financial reasons. The Settlement Department found themselves unable, with the funds they had in hand, to satisfactorily supervise the whole of the work set out in the season's programme which, therefore, had to be cut down.

Field operations commenced on the 5th November 1899 and closed on the 9th April 1900, when the section moved into recess quarters at Bhagalpur, for reasons already given in paragraph 30 of this report.

The following tabular statement gives in detail the areas surveyed and khanpuried:—

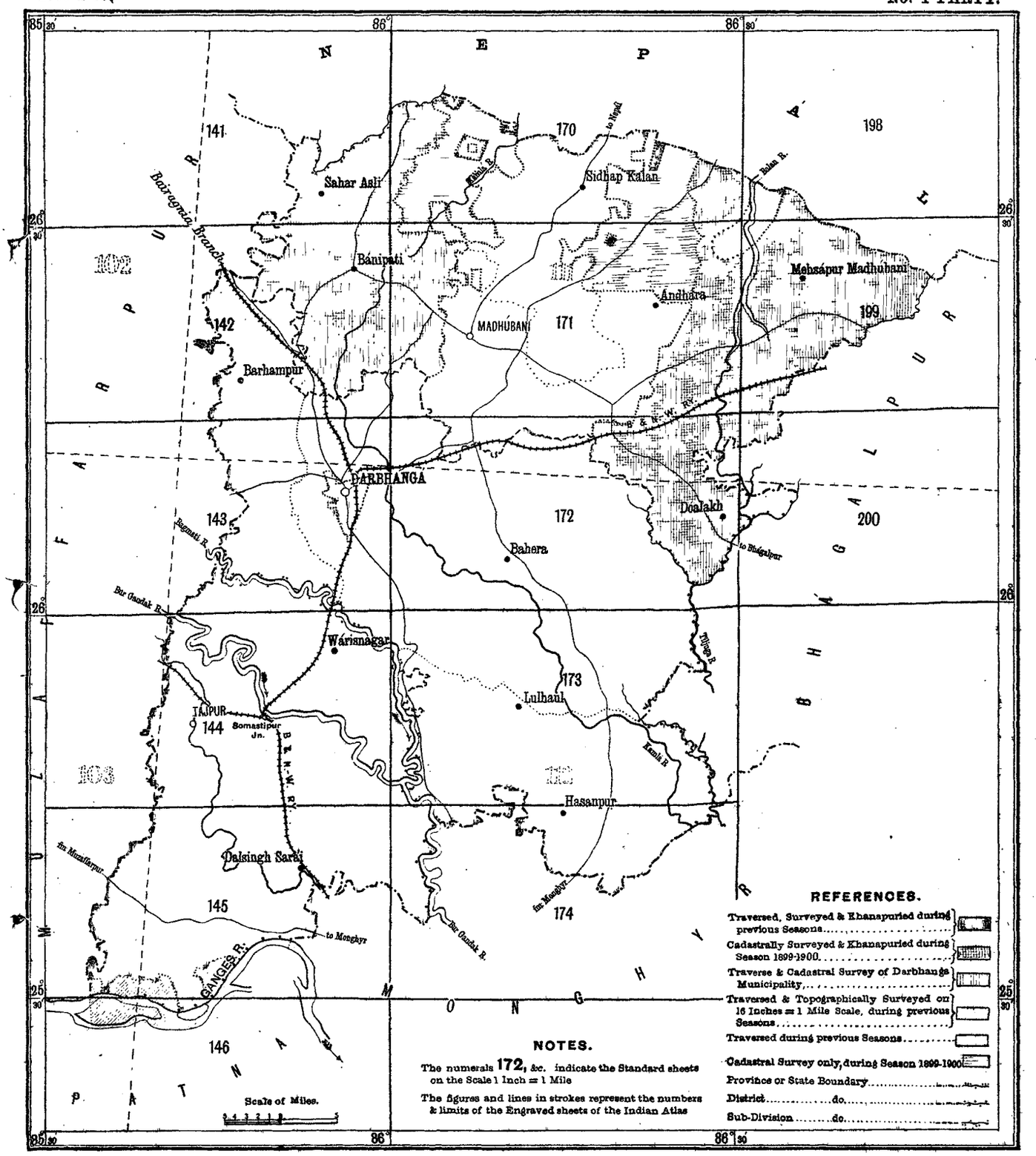
Thanas.	Parganas.	Survey.			Khanapuri.		
		Villages.	Fields.	Square miles.	Villages.	Fields.	Square miles.
1	2	3	4	5	6	7	8
Benipatti.	Bachhaur ...	1	2.140	1·05	1	2,140	1·05
	Basotra ...	1	1,503	0·85	1	1,503	0·85
	Bhala ...	48	116,278	60·96	48	116,278	60·96
	Bharwara ...	6	12,809	6·77	6	12,809	6·77
	Jarel ...	141	288,457	159·03	141	288,457	159·03
	Notau ...	50	82,831	47·45	50	82,831	47·45
	Tajpur ...	25	26,996	15·98	25	26,996	15·98
Khajauli.	Bachhaur ...	21	43,686	31·18	...	...	...
	Bhala ...	44	102,097	62·79	...	...	...
	Gaur ...	1	1,384	0·86	...	...	...
	Hati ...	5	7,392	3·97	...	...	...
	Jabdhi ...	57	115,056	87·19	...	...	...
	Total ...	400	8,00,629	478·08	272	5,31,014	292·09

The mapping of the 400 villages surveyed is contained on 662 sheets on the scale of 16 inch=1 mile, in addition to which there are 503 sheets on the 64=″1 mile scale of village site surveys, for which there was not sufficient space on the margins of the 16″ plans. The average size of the field in the area surveyed and khanapuried is only ·35 of an acre.

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT DARBHANGA.

1899-1900. No. 4 PARTY.



NOTES.

The numerals **172**, &c. indicate the Standard sheets on the Scale 1 Inch = 1 Mile

The figures and lines in strokes represent the numbers & limits of the Engraved sheets of the Indian Atlas

REFERENCES.

- Traversed, Surveyed & Khanapuried during previous Seasons
- Cadastrally Surveyed & Khanapuried during Season 1899-1900
- Traverse & Cadastral Survey of Darbhanga Municipality
- Traversed & Topographically Surveyed on 16 Inches = 1 Mile Scale, during previous Seasons
- Traversed during previous Seasons
- Cadastral Survey only, during Season 1899-1900
- Province or State Boundary
- District ..... do. .....
- Sub-Division ..... do. .....

Reg. No. 618, Bengal.—Jan 01 —650.

Photo. S. I. O., Calcutta.

In the area surveyed, 1,605 linear miles of check survey were run by survey officers and "independently," and 1,519 linear miles by Inspectors, which gives an incidence of 6·55 linear miles of test survey to each square mile of detail survey. Besides this amount of check surveys, portions of 283 village sites were re-surveyed "independently" and 1,353 "partal" lines were run through the main streets and alleys.

The total number of khasra entries checked in the field by the survey officers was 10,722 and by Inspectors 147,922 or a grand total of 158,644 which gives an average of 30 per cent. on the whole number of plots khanapuried. These figures do not include the checking done by the Assistant Settlement Officers and kanungos.

The area surveyed was divided into three circles, each in charge of a European Assistant and a Head Inspector. The average outturn of each amin per diem was 21 acres in survey and 67 numbers in khanapuri.

The health of the establishment has been good throughout the season.

The number of boundary disputes submitted for the decision of the Settlement Officers was 257, of which 187 refer to thana Benipatti and 70 to thana Khajauli. The former have all been settled and the latter will be decided next field season, there being no Settlement Officer available for the work this year. There were 21,120 disputes affecting entries in the field records. Of these, the kanungos have disposed of 20,815 and the balance of 305 remains over for settlement at the time of attestation. The return of the dispute files have again this season been the cause of much delay; it was not till the 12th July that the last of the files was received back, thereby preventing the correction of the maps and records. Out of a total of 267 dispute files only 75 were dealt with by the kanungos during the field season.

Mr. Smart reports that the Collectorate registers were received in good time. As in previous seasons, the khewats were prepared by the Survey Inspectors. The usual comparison with the Collectorate registers was made and all differences showing unrecorded mutations were entered in red in the present khewats.

In the area khanapuried there were 174 villages of pattidari tenures and 98 wahid zamindari. The camp officer reports that the pattidari tenures in thana Benipatti were of a very intricate nature.

The new form introduced at the close of season 1898-99 to ensure the better attendance of raiyats and zamindars at the time of survey and khanapuri has been used with great success during the present season. Preliminary notices for non-attendances, however, had to be used; of these, 1,248 were issued, and in cases of repeated non-attendance, process notices had to be served; these realized Rs. 365-4 and fines inflicted represented a sum of Rs. 355.

The boundaries of the Revenue Survey mauza have been carefully compared with the present village boundaries, and any differences between the two surveys of over five chains have been shown on the original maps and the traces supplied to the Settlement Department by a broken line in red ink.

All the maps and records have been completed. The former, with the field area statements, have been retained in the section for the disposal of attestation badars, the latter, with traces, have been handed over to the Settlement Department.

The sum of Rs. 1,080-1-7 was deposited by zamindars and others for copies of maps and records. Of this amount Rs. 828-1-11 has been paid to the copyists, and the balance Rs. 251-15-8 has been credited to Government for fees, forms, etc.

The greatest difficulty encountered during the season was the very large number of traverse stations missing in the area under survey, and which greatly delayed the start of the work. The traverse survey of this area was done in seasons 1893-94 and 1895-96, and I can hardly believe the disappearance of such a large number of marks in the course of four or five years is due solely to natural causes. There is no doubt that not the slightest attempt is made on the part of zamindars to preserve traverse stations, and that the receipts taken from the headmen of villages for the safe preservation of marks are of little or no value.

Another circumstance tended to somewhat delay khanapuri in the Raj villages, namely, the appointment by the Darbhanga Raj of their own amins

and muharrirs to take copies of the khasras, etc.; these men often failed to keep pace with the survey amin, when they would demand direct copies of the records from him. The matter was brought to the notice of the Raj authorities who put a stop to it.

Mr. Smart reports that the attitude of the inhabitants was, on the whole, better than that experienced in previous seasons. The country surveyed is very fertile and is traversed by the Bagmatti and Kamla rivers.

Mr. W. Gourlay, I.C.S., was in charge of the settlement camp. He had as his Assistant Babu Atul Chunder Kur up to the 15th February, and from that date Moulvi Ashfaq Hussain, to aid him in dealing with boundary disputes and in supervising the khanapuri. Two kanungos, Jahrul Hossain and Surid Chander Deb, were employed in deciding internal disputes and checking khanapuri.

No free labour was furnished during the survey stage and the expenditure for cooly bills was Rs. 5,574-14-3. This amount is exclusive of shares for control, etc., and has been included in the total cost of the survey, but represents in itself a rate of Rs. 11-10-7 per square mile.

The services of officers are referred to in paragraph 54 of this report.

Of the native establishment the following are worthy of mention:—

Accountant, Harak Narain; writer, Ishri Pershad; draftsman, Imam Ali; Record-keeper, Ahmed Ali; Head Inspectors, Ramzan Ali and Abdul Rauf; Inspectors, Sheonandan Singh, Jagdam Sahai and Basharat Ali.

Nepal Boundary.

A re-survey was made on the 16″=1 mile scale of the Nepal *cum* Darbhanga boundary from P. P. No. 17 up to S. P. No. 1, adjoining P. P. No. 58. The portions lying between P. P. No. 21 and S. P. No. 10; S. P. No. 11 and P. P. No. 37; S. P. No. 15 and S. P. No. 16; P. P. No. 44 and P. P. No. 47 were omitted. These portions will be surveyed next field season.

The portions surveyed have been compared with Colonel Tanner's survey of 1882-83, and the boundary was found to agree fairly well, except in the following cases:—

From P.P. No. 20 to P.P. No. 21	...	The distance was found to be 2 chains 32 links, whereas Colonel Tanner's map shows it to be about 5 chains.
From S.P. No. 16 to P.P. No. 42	...	Distance found to be 46 links. Colonel Tanner's map gives 1·95 chains.
From P.P. No. 43 to S.P. No. 17	...	Distance found to be 70 links. Colonel Tanner's gives 2·25 chains.
From P.P. No. 44 to S.P. No. 18	...	Distance found to be 94 links. Colonel Tanner's map shows 2·46 chains.
From P.P. No. 50 to S.P. No. 22	...	The position of S.P. No. 22 is out by about 14 chains. In Colonel Tanner's map it is shown as being at the trijunction of mauzas Kasera, Maharnia and Nepal, whereas it is really situated at the trijunction of mauzas Kasera, Mahadeo Patti and Nepal.

All differences have been re-surveyed "independently," and the accuracy of the present survey has thus been verified.

A trace map showing the past and present boundary, with a detail report of all differences, has been prepared and submitted to the Collector of Darbhanga.

The cost of this work has been included in that of the general operations.

Darbhanga Badar Work.

During the current season the attestation badars of 1898-99 were dealt with. The establishment consisted of three draftsmen and three computers. The following table gives the area dealt with—

Villages	...	...	1,066
Fields	...	...	1,157,451
Square miles	...	...	548·09

In the above mentioned area, badars were received for 752 villages, affecting 5,300 plots, which gives a percentage of 0·46 on the total number of fields. No badars were received for 314 villages.

Thana Phulparas.

Cadastral Survey with Records.

39. This cadastral section was under the supervision of Mr. C. S. Kraal throughout the season. He had as his assistants Babu Nilmoni Chatterji, Mr. E. G. Hardinge and Mr. A. E. LeFrance (Supervisor). In addition, Mr. L. FitzGibbon was appointed as a Supervisor from the beginning of the recess season in the place of two inspectors who had proceeded on leave.

The native establishment consisted of:—

Head Inspectors	...	...	3
Inspectors ...	...	...	26
Amins ...	...	...	260
Mirdhas ...	...	...	321

Besides the above, there were 119 writers, computers, draftsmen, tindals, khalasis, &c.

This section took the field on the 27th October 1899. The season's programme, with the exception of the khanapuri of three villages, was completed by the 10th April 1900, on which date the section went into the new recess quarters at Bhagalpur. A head inspector was left in charge of the unfinished balance of khanapuri, the khasra entries of which were checked by Mr. E. G. Hardinge.

The season's programme for this section comprised the survey and record writing of the villages situated in thana Phulparas, omitting the fourteen tolas of Bhajhnaha of the Lahiri taluk, these tolas having been surveyed during season 1895-96.

The entire area was divided into three circles each, supervised by a European officer and a head inspector assisted by an average of eight inspectors.

The whole programme has been completed, and the subjoined tabular statement gives the outturn under the various heads:—

Thana.	Pargana.	Survey and Khanapuri.		
		Villages.	Fields.	Square Miles.
1	2	3	4	5
Phulparas.	Alapur	191	395,448	265·97
	Jabdi	23	69,417	49·18
	Dharaur	27	60,988	34·77
	Pachahi	46	98,788	48·19
	Khand	28	39,418	25·10
	Mokarampur	5	23,678	10·40
	Narediga	4	3,079	1·41
	Bhaur	3	6,765	3 53
	Total	327	697,581	438·55

The average size of the field works out at 0·40 of an acre.

Out of a total of 250 amins employed in this section, 187 were "Local" men and the balance "Foreign"; nearly all these amins were old and experienced hands. The daily outturn of each class is given below:—

	Survey. Acres.
Foreign Amins	18
Local ,, ...	16
	Khanapuri. Nos.
Foreign Amins	57
Local ,, ...	70

The cadastral survey on the 16″=1 mile scale was mapped on 631 sheets; for the survey of the village sites on the 64″=1 mile scale, an additional 449 sheets were required.

The European officers ran 894 linear miles of test survey, inclusive of "independent" partals, which averages 1·92 linear miles to the square mile; in addition 1,155 linear miles of partals were run by the Inspectors. The total 2 049 miles of check lines gives an incidence of 4·66 linear miles of test survey to each square mile of detail. To gauge the accuracy of the large scale village site surveys 549 blocks were re-surveyed independently, and in addition 1,240 partal lines were run along the main sheets.

Of the khasra entries, 6,075 were checked by the Survey officers, 193,925 by Inspectors, bringing the total number of entries examined to 200,000. This works out to a percentage of ·29 on the total number of plots khanapuried. These figures are exclusive of any checking done by the Assistant Settlement Officers and kanungos of the Settlement Department.

The temporary demarcation of the village boundaries throughout the area by means of earthen mounds was on the whole good. The officer in charge of the section reports that several theodolite stations were missing in pargana Jabdi, which necessitated the employment of a couple of traverse surveyors to re-lay them, and slightly delayed the work.

During the season under report there were 158 boundary disputes, all of which have been settled. This number includes fourteen inter-district boundary disputes.

Process-fee notices to the number of 789 were issued during the season. Fees to the amount of Rs. 483, representing 645 cases of repeated non-attendance, were realized. Fines under the Survey Act to the extent of Rs. 480 were inflicted, this sum was paid into the Laheria Serai Treasury, to the credit of Government. The attendance of the zamindars and raiyats at both stages of survey was, on the whole, better.

The comparison of the village boundaries as surveyed during the present season with those of the Revenue Survey of 1844-45, was favourable in the main, differences were found in only nine cases.

At the conclusion of the season's work an independent survey was made of the district boundary adjoining Nepal; a comparison of this survey with that of Colonel Tanner's season 1882—84 showed that there had been no appreciable change in this boundary.

The usual procedure of taking eight-anna stamped agreements from amins was adhered to, and a sum of Rs. 75 was realized under this head.

The health of the establishment throughout the season was good. There were a few cases of fever and two deaths, the result of dysentery.

Both the maps and records of the season's operations have been completed. Traces of the former and the latter in original have been handed over to the Settlement Department.

Three kanungos were appointed by the Settlement authorities, and placed one in each circle to supervise the writing of the records and to enquire into and dispose of all interior disputes. There were 21,114 such disputes, affecting 53,107 plots, all of which have been settled. The camp officer, however, complains that in several cases the enquiries made by the kanungos were by no means satisfactory.

The number of pattidari tenures met with in the area under survey was not large, nor were they of an intricate nature. The following statement shows the number and description of the different tenures dealt with:—

	Number of villages.
Pattidari	51
Ijmali	51
Wahid zamindari	235
Total ...	337

The sum of Rs. 3,307-10-5 was received from zamindars, and others for copies of maps and records. Of this amount, Rs. 2,682-6-6 has been paid to

copyists, and the balance of Rs. 625-3-11, which represents the cost of tracing cloth, forms and fees has been credited to Government.

The "cheraut" system of khanapuri was adopted in the following villages of thana Phulparas :—

Villages.	No. of Fields.
Bangawan Jhitki	10,497
Lakhnour	10,138
Madhaipur	10,010
Dip	11,691
Bhit Bhagwanpur...	6,918
Karmeg	18,051

This system allows of two or more amins to simultaneously carry on the khanapuri of a large village and at the same time to use one serial. The results have always been most successful.

The services of the officers of this section are alluded to in paragraph 34 of the report. Of the native establishment, the following are deserving of special mention:—

Draftsman Abdul Majid and computer Chander Dey; draftsmen Bindesi Pershad, Hari Chander Bhatacharji, Raghunanden Choubey and assistant writer Rama Kissen Lal, are also deserving of mention.

No free cooly labour was supplied, and the expenditure under this head amounts to Rs. 5,333 (exclusive of shares for supervision, etc.) This in itself gives an incidence of Rs. 12-2-4 per square mile.

Badar work.

The badar establishment of this section, consisting of three draftsmen and three estimators dealt with the badars of season 1898-99, district Darbhanga. Out of a total of 916 villages, badars were only submitted for 395, affecting 3,210 plots, which gives a percentage of ·45 on the total number of fields in the area (683·82 square miles) dealt with. For 521 villages no badars were received.

The total expenditure incurred by the combined cadastral sections for the season's operations in this district is Rs. 1,72,365, of which Rs. 83,515 are debitable to cadastral survey, including the completion of maps, area extraction and traces, and the balance Rs. 88,850 to khanapuri and the completion of the records and statistics. The resulting cost rates are—

	Per square mile. Rs.
Survey, &c.	91·07
Record-writing, &c.	121·54

At first sight these rates appear high, but if the following points are taken into consideration, it will be found the present cost rates compare favourably with those of previous seasons.

(*a*) Although the programmes of both cadastral sections in district Darbhanga were considerably reduced, the European supervising staff and the office establishments remained the same, and consequently the share of supervision, falling as it did on a small area, was very heavy.

(*b*) After the commencement of the field season orders were received to discontinue all work in thana Khajauli; the detail survey of this area was, however, so advanced that it was considered advisable to complete this stage and to leave the record-writing only for the following season. This additional curtailment of an already reduced programme was bound to enhance the cost rates.

(*c*) A large percentage of the theodolite stations in both thanas Benipatti and Khajauli (traversed in seasons 1893-94 and 1895-96) were found to be missing. All such stations had to be relaid, and in some instances fresh traverses run; this naturally delayed

the commencement of the detail survey and caused a corresponding increase in the expenditure.

(*d*) The work was also retarded in thana Phulparas, owing to the late and heavy rains having inundated a large portion of the country.

(*e*) The postponement of survey operations in the Backergunge and Champaran districts threw a heavier share of the "controlling office charges" on the remaining surveys, the total cost of which office was practically borne by the Bihar camps and the Sonthal Parganas detachment.

Sonthal Parganas District.

PRIVATE ESTATES.

Traverse.

40. For report see page 12.

PART III.—REPORTS ON MISCELLANEOUS SURVEYS.

Noakhali District.

Traverse Survey.

41. As the survey operations in this district were not undertaken for settlement purposes, but solely to ascertain the areas of certain "chars" and their suitability for cultivation, the Board of Revenue was of the opinion (*vide* their letter No. 23A. dated 22nd March 1900) that no notification of survey need be made nor was the sanction of Government necessary.

It was intended originally that this work should be supervised by the Assistant in charge of the Backergunge operations. Owing, however, to the postponement of the survey in that district, Captain Symonds, in order to secure better supervision, applied for permission to place Mr. T. W. Babonau in charge of the Noakhali work, and at the same time asked for an additional grant of Rs. 2,000 to meet this extra charge; to this the Board accorded their sanction.

At the request of the Collector of Noakhali the topographical survey of the chars was limited to the area lying between the traverse lines and the water's edge, no details within the traverse polygons were surveyed.

The following is a list of the chars which came under traverse and topographical survey:—

1. Char Bose.
2. „ Agasti.
3. „ Hazimara.
4. „ Mirzamara.
5. „ Narayen.
6. „ Goranga.
7. Char Mandalia.
8. „ Ghina Dhapa.
9. „ St. George.
10. „ King.
11. „ Mir Mahomed Ali.
12. „ Latia.
13. Char Macpherson.

The strength of the detachment was as follows:—

Mr. T. W. Babonau (in charge).
3 Sub-surveyors.
1 Inspector.
3 Amins.
36 Tindals and khalasis.

The whole of the traverse work was "set up" in the Bihar Traverse Section, and after being proved and plotted, the plane-table sheets were despatched to Mr. Babonau who distributed them to the amins.

The unit of traverse survey was a "char."

The original idea had been to mark all theodolite stations with wooden pegs, but at the request of the Collector of Noakhali, the following permanent marks were used.

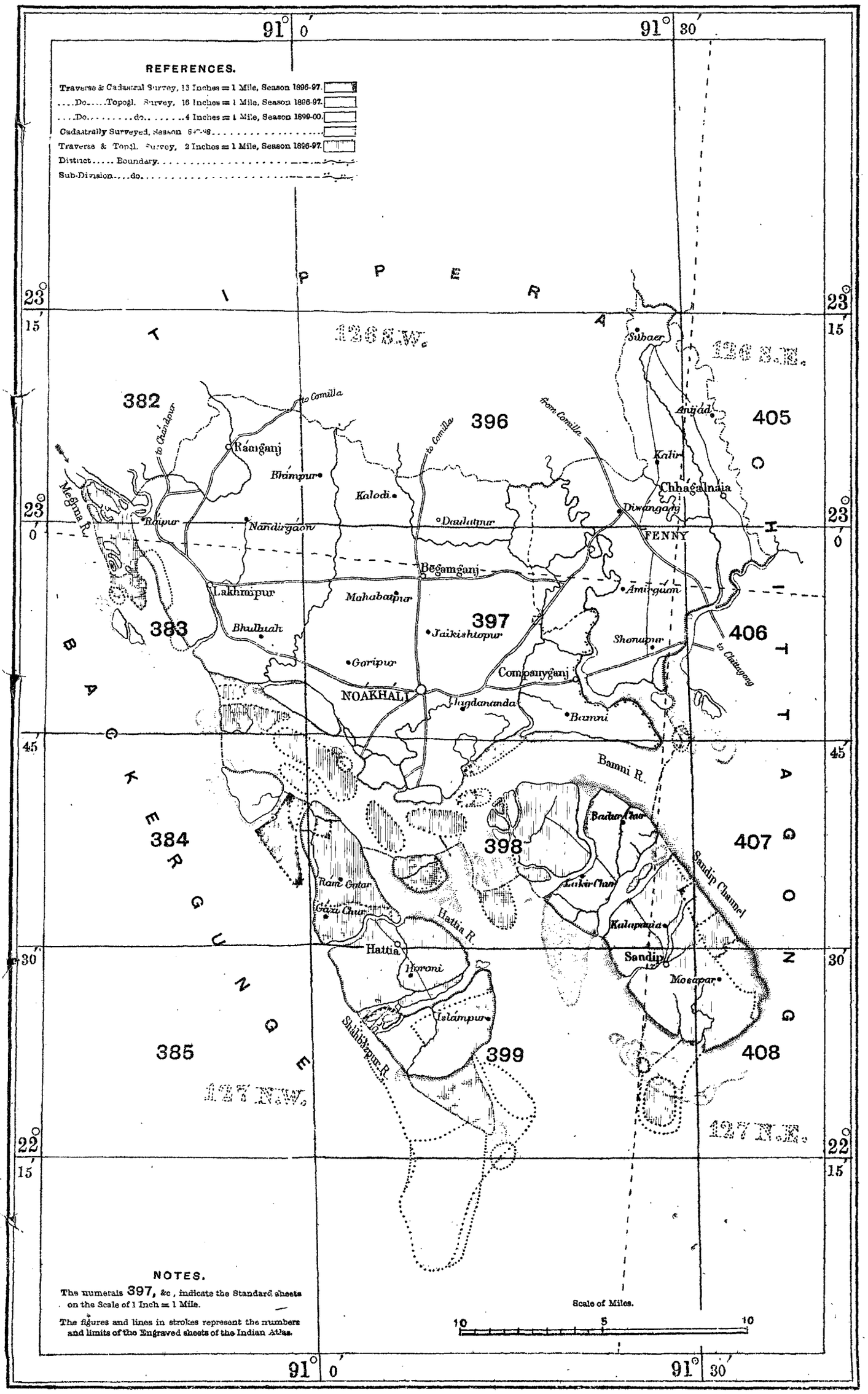
25 Burn & Co's. cylinders which remained over from Mr. Berkeley's survey of 1896-97.

27 Stone pillars (6′ × 1′ × 6″).

BENGAL SURVEY.

INDEX TO THE CADASTRAL & TOPOGRAPHICAL SURVEYS IN DIST. NOAKHALI.

1899-1900. DETACHMENT.



Reg. No. 19. Bengal.—Jan 01—650

Photo. S. I. O., Calcutta.

These stones were paid for by the Collector. The intermediate theodolite stations were all marked by wooden pegs.

Except during the last month's work, only 1 chain was used by the sub-surveyors. All the chains were checked in the usual manner.

Connections were made to three stations of East Calcutta longitudinal series, namely :—

1. Lakhinagar Station,
2. Matabi Station,
3. Bijar Singh G. T. Station,

and also to the traverse work of 1896-97. The error in feet per mile, as deduced from the triangulated and traversed distances, is as follows :—

1. Lakhinagar to Matabi ... ... 2·7
2. Matabi to Bijar Singh ... ... 7·7

There were 214·3 linear miles of new chaining. The theodolite was set up at 608 stations, or, excluding "Shuru" and "Milan" angles, at 556 stations. In all 24 observations were made for Azimuth. The corrections applied to the angular work was 1′ in every 22 angles.

The average correction applied to the chaining was 6 links per 100 chains on the perpendicular and 7 links per 100 chains on the meridian.

The origin of survey was that used during season 1896-97, namely, the intersection of North Latitude 22°-30′-0″ and East Longitude 91°-30′-00.″ The magnetic variation of the compass derived from the mean of 24 observations for Azimuth is 1°·42′ east of the true meridian.

Topographical Survey.

42. The topographical survey of these chars, as already stated, consisted merely in the survey of all details exterior to the traverse polygons up to the water's edge.

The accuracy of the work was tested by the Inspector and also by means of "independent" partals, of which 22·9 miles were run. The officer in charge also ran about 3 miles of check survey.

The plane-tabling of the first-half dozen sheets of chars Mir Mahomed Ali and Bose was on the 16″=1 mile scale. It was then decided that as areas exterior to the traverse blocks were only to come under topographical survey the scale of 4″=1 mile would be more suitable and the remainder of the sheets were in consequence done on this scale.

Only one case of a disputed boundary occurred, namely, on char Mirzamara.

The total area traversed is 61·84 square miles and that topographically surveyed 5·7 square miles. The mapping has been done on 12 sheets on the 16″ and 4″ scales, traces of which have been forwarded to the Collector.

Char Macpherson still remains for traverse and detail survey. This char was traversed, but owing to faulty work on the part of the sub-surveyor, the traverse polygon did not prove; a final revision could not be attempted on account of stormy weather. There should be no difficulty in completing the survey of this char next season *pari passu* with the work in the Backergunge district. With this exception the programme has been completed and there are no arrears of work of any description.

My remarks on the services of officers will be found in paragraph 54 of the report.

Of the native establishment Sub-Surveyor Gafur Bux is deserving of special mention.

The total cost of the season's operations amounted to Rs. 6,839, which gives a cost rate of Rs. 100·57 per square mile.

BALLIA DISTRICT, NORTH-WEST PROVINCES.

MAUZA JAUHI OF THE DUMRAON RAJ.

Traverse Survey.

43. The survey of this village was undertaken at the request of the Government of the North-West Provinces and Oudh, *vide* their letter No. $\frac{1649}{1-1290}$, dated 11th May 1899, to the Government of Bengal. In compliance with instructions received under Endorsement No. 45A, dated 18th August 1899,

from the Secretary to the Board of Revenue, Lower Provinces, Captain C. W. H. Symonds, on the 26th November 1899, deputed a sub-surveyor to proceed to Dumraon for the purpose of starting the traverse survey of the village. The man was, however, sent back in the course of a few days by the Assistant Manager of the Raj, who intimated that he expected the survey to be done by a European officer, as it would be impossible for a native surveyor to cope with the opposition it was probable the villagers would offer to the survey operations.

Captain Symonds informed the Board of what had occurred, and on the 22nd February 1900, a reply was received from the Government of Bengal, intimating that the survey was to be done by native agency under European supervision, and expressing a hope that the work could be undertaken and completed during the field season of 1899-1900.

A competent surveyor was ordered to proceed immediately to Ballia, and after a certain amount of delay, due to the absence of the Assistant Manager, the traverse of the village was commenced on the 11th March and completed by the 23rd of that month.

The mauza, the traverse area of which is 8·45 square miles, was divided into nine blocks by means of sub-traverses; this allowed of the cheraut system being adopted for the detail survey and khanapuri.

The field-book of each block, on completion, was immediately sent to the Bihar Traverse Camp for "setting-up" and plotting. The 16″ sheet of the block was then forwarded to the cadastral camp. By thus cutting up the village and distributing the work, it was hoped that the survey and khanapuri might be completed before the commencement of the rains.

The village was "set-up" on its own origin. To check the angular work six azimuths were observed. Only one chain was run by the sub-surveyor, but he was supplied with two spare chains which were tested alternately each week against the traverse camp standard. The running chain was checked daily against the "partal" or spare chain.

The total number of linear miles of chaining was 32·64. The theodolite was set up at 116 stations in all.

The total expenditure incurred on their traverse survey, including computations, etc., was Rs. 347.

Cadastral Survey with Records.

44. The establishment employed on this work consisted of one Inspector and seven amins selected by Mr. A. W. Smart from his section.

The detail survey commenced on the 9th April and closed on the 4th June. Mr. P. L. Causley, Sub-Assistant Superintendent, supervised and checked the work from the 11th May to 28th June.

The area of the village is 4,336·08 acres or 6·77 square miles and contains 3,084 fields. The mapping has been done on 9 sheets on the 16″=1 mile scale, and in addition there are 2 sheets on the 64″=1 mile scale for the village sites.

The average size of the field is 1·41 acres. The detail survey has been checked by 21·56 linear miles of "partal" run by Mr. Causley and "independently" and 23·74 linear miles by the Survey Inspector. The total amounts to 45·30 linear miles, which gives an incidence of 6·69 linear miles of check survey to each square mile surveyed. In the record of rights 319 entries were checked by the Assistant and 935 entries by the Survey Inspector. The total number of entries checked amounts to 1,254, which gives an average of 40 per cent. on the number of fields khanapuried. There is one boundary dispute with mauza Shiupur Diar Gangbarar, embracing an area of 1,164 acres, which remains to be decided. Of internal disputes there are 146 also remaining for settlement.

The record of rights has been prepared according to the Bihar Rules, which differ slightly from those of the North-West Provinces. A copy of the latter was obtained from the Superintendent of Land Records, North-West Provinces, and on a comparison being made, it was found that there were only two differences of any importance, viz., the status of raiyats and a verification of previous maps and papers. The Assistant Manager of the Dumraon Raj

objected to the Bihar Rules and applied for the services of an Inspector from the North-West Provinces Survey, but as no man was available, it was decided that the Bihar Rules should stand, and any differences between the two could be settled by the Collector at the attestation stage. This matter not being decided till the end of June, the establishment had to remain out till that period.

The last cadastral survey of Mauza Jauhi was made in season 1882-83. Since then, there has been a great change in the periphery of the village, the Ganges River having changed its course to the extent of $2\frac{1}{2}$ miles. On the southern face of the village there is an accretion of 2·81 square miles and on the eastern side a decretion of 2·68 square miles. The north-western portion of the village, which is on high land, remains practically unchanged, but in the raiyati holdings there are many alterations.

The boundaries of the Revenue Survey of 1844-45 and the Diara Survey of 1863-64 cannot be shewn on the present maps, owing to the peripheries being totally different and without any common points. The boundary of the 1882-83 survey has been shewn on the present map by a broken red line.

Mr. Causley reports that he experienced great difficulty in getting the attendance of the raiyats and headmen of the village, especially in the alluvial lands where there was practically no demarcation of the field boundaries. As on his departure he noticed the villagers carting loads of rough stone prisms towards the river, ostensibly for the purpose of demarcating their field boundaries, it is to be regretted that this permanent marking was not carried out prior to the survey.

The total expenditure on this survey, inclusive of the traverse operations, has been Rs. 1,761.

The sum of Rs. 700 (exclusive of shares of control, etc.) was originally estimated for this survey.

The excess expenditure is solely due to the following causes:—

(*a*) Delays in starting the traverse survey.

(*b*) There was practically no demarcation of field boundaries, this greatly hindered the cadastral operations. Bad attendance on the part of the villagers at the survey and khanapuri stages also caused delays.

(*c*) The Raj authorities objected to the use of the Bihar Rules for the khanapuri. It was some time before this question was settled, and resulted in Mr. Causley and the cadastral establishment being detained in the field nearly a month longer than should have been necessary.

Saran District.

Chapra Municipality.

45. The records and trace maps of the urban area were completed and made over to the Chairman of the Municipality in the month of April last. The wall map on the 16″=1 mile scale has been completed on Imperial paper, of which a tracing on bank post remains to be done. This work will be completed about the middle of November.

The previous expenditure amounted to Rs. 3,233 and during the year under report a further sum of Rs. 1,194 has been incurred, making a total of Rs. 4,427, which is recoverable from the Municipality.

Saran-Patna Diara.

Relaying and marking of village tri-junctions with permanent marks.

46. This skeleton boundary survey was taken up at the request of the Collector of Patna, who, in his letter No. 235,, dated 19th December 1899, to the Settlement Officer, North Bihar, stated that permanent stone marks were absolutely essential at all village tri-junctions for the prevention of encroachments by the neighbouring zamindars.

Captain Symonds pointed out to the Collector of Patna that the embedding of permanent marks in areas subject to riverain action is more or less a waste of money, as no matter what description of marks are put down nearly all will be washed away during the following rains; that should any disputes arise in such an area it would be simpler and far less expensive to relay such disputed boundaries by traverses from and to permanent stations on the high land. The Collector of Patna was, however, still of the opinion that all the village tri-junctions in these Government diara estates should be permanently marked. Captain Symonds, therefore, issued orders for the commencement of this survey, and at the same time requested the Collector to arrange for the demarcation of the village boundaries by stakes and the collection at convenient centres of supplies of stones for the marking of the village tri-junctions. As only the positions of the latter points were required to be fixed, the two and-a-half chain offset rule was ignored and the longest possible traverse lines were run round each village.

The work was then "set up" and plotted and the original survey of this area transferred to the new plots. The tri-junctions were then laid down on the ground by means of offsets and the stones embedded at these points.

As this area was surveyed in both traverse and detail in the previous season, and, according to the procedure followed in diara tracts, no permanent marks were embedded, it is to be regretted that, if such were required in this particular instance, these marks could not have been put down during the original survey, thereby avoiding a double expenditure on traverse.

The total cost incurred on this work is Rs. 536, and is to be borne by Government.

Darbhanga District.

Darbhanga Municipality.

47. The compilation of the record of occupancy of this municipality was commenced in October 1899 and completed by the end of March 1900, one Inspector and five selected amins being engaged on this work.

There are 30,326 holdings in the municipal area. The average size of a holding is ·07 of an acre; this in itself proves the work to have been of a most intricate nature. The areas of holdings have been extracted to three places of decimals of an acre and entered in the khasras in both acres and local measure.

The entries against 4,971 plots in the record of occupancy were checked by a European Assistant or the Inspector.

Independent surveys of 153 blocks, in addition to the 5·5 linear miles of "partal" mentioned in last year's annual report, were made in order to further test the accuracy of the detail survey.

There were 3,477 internal and eight boundary disputes, all of which have been settled.

The urban area of the municipality extends over 23 entire and portions of 29 revenue survey villages.

The camp officer reports that throughout both stages of the survey operations many difficulties and delays, such as the following, were encountered:—

(1) Inclemency of the weather.

(2) Refusal of the occupants of houses to allow the amins to enter their courtyards.

(3) Non-attendance at time of record-writing.

(4) Indifferent demarcation of village and mahalla boundaries, resulting in the work in many instances having to be re-done.

(5) The large number of internal disputes. These could not be settled in the absence of the inspector or amins and necessitated the retention of the establishment for a longer period.

These delays rendered it impossible for the establishment to be paid by contract and consequently added to the cost rates of the work.

Traces of the 64″ sheets and the original records of occupancy have been forwarded to the Chairman of the Municipality.

The wall map comprising 10 sheets on the 16″ scale, only remains for completion and will be finished by the end of January 1901. A combined trace of the wall map on bank post paper will be supplied to the Municipal Board.

The total cost incurred during the year under report amounts to Rs. 4,105.

Shahabad District.

Relaying of the disputed boundary between the Kachuar and Banskatti Mahals.

48. Owing, as noted in paragraph 51 of the Annual Report of 1898-99, to the services of Mr. Gasper being urgently required on the Nepal frontier, the completion of the demarcation of the boundary between the Kachuar and Banskatti Mahals had to be postponed till the current season.

On the 16th December 1899, the Collector of Shahabad reported that stone pillars for the delimination of the boundary were in readiness and stored at convenient centres, and asked for the services of a Survey Officer to complete the demarcation.

There being no European assistant available for this work, Captain Symonds, with the consent of the Collector, deputed Babu Dharnidhar Mukerji, a first-class sub-surveyor to relay and demarcate the 1844-45 revenue survey boundary.

The sub-surveyor left for Sasaram on the 17th January 1900. He was furnished with the traverse data and field books of the survey done by sub-surveyor Irfan Ali, trace maps of the work done by Mr. Gasper in season 1898-99, and the original revenue survey maps of 1844-45.

The Kachuar (Private) Mahal touches the Banskatti (Government) Mahal to the west, south and east. Of this common and disputed boundary the southern portion had been demarcated in 1887 by a Civil Court amin. The Collector of Shahabad at first decided that all the amin's stations still in existence on this boundary must be respected, and that only those portions in which pillars were missing should be relaid according to the revenue survey of 1844-45.

However, when traversing these portions, the demarcation as done by the Civil Court amin was found to be very inaccurate; the differences between his survey and that of 1844-45 in some instances amounted to nearly 15 chains. This was pointed out to the Collector, who then decided to ignore the amin's work and to have the entire length of the southern boundary relaid according to the old revenue survey.

Nearly 70 per cent. of the old pillars were found in the course of re-fixing their positions; these old marks were in every instance allowed to stand and the new pillars embedded alongside.

All village trijunctions on the old revenue survey boundary with their "jawabs" have been marked by three foot masonry pillars. Of these there are 69.

Stone pillars ($5' \times 1\frac{1}{2}' \times \frac{1}{2}'$) to the number of 121 were embedded along the southern and eastern boundaries. For the demarcation of the western boundary smaller stones marked with a broad arrow had to be used, as this boundary followed a line along a hill top. The weight of the large stone pillars made their cartage up the hill an impossibility. In all 51 of these smaller pillars were embedded. On the completion of the demarcation, the Settlement Officer of Sasaram marched along the entire length of the boundary inspecting the position of every pillar.

In addition to the above survey, Babu Dharnidhar, at the request of the Collector of Shahabad, demarcated a small neighbouring Government estate known as "Murli Hill." The area of this mahal is about 105 acres. Fifteen stone pillars were embedded along the boundary of this estate.

Babu Dharnidhar Mukerji deserves much credit for the satisfactory manner in which he completed the demarcation of these estates.

The total expenditure incurred amounts to Rs. 313, and has been met from the Bihar grant.

Arrah Town, Semri and Lakhan Dehra Private Estates.

49. The Collector of Shahabad applied for the services of a sub-surveyor to carry out a traverse survey of the Arrah Municipality; in addition, the private estates of Semri and Lakhan Dehra were also traversed. The cost of "setting up" and supplying plots of these petty surveys has been borne by the Collector, and is as follows:—

	Rs.
Arrah Town	192
Semri and Lakhan Dehra Private Estates	54

MONGHYR DISTRICT.

Binda Diara Boundary Dispute.

50. Owing to a dispute as to the boundary between the Binda Diara Government estate and that of the Banaili Raj, the Collector of Monghyr asked for, and obtained the services of, a sub-surveyor to re-lay the 1865 boundary between these two estates.

The total expenditure incurred on the work is Rs. 409, and has been met out of the Bihar Grant.

BHAGALPUR DISTRICT.

Nepal Frontier.

51. This survey consisted of the laying down of reference pillars in order to fix the positions of certain bends on the Nepal-Bhagalpur frontier. As these bends lie in the bed of the Kosi river, the erection of pucka pillars at the points would have been of little avail; the employment of reference pillars had therefore to be resorted to. Captain C. W. H. Symonds deputed me to supervise and carry out this work. I arrived at Birpur on the 1st November 1899, where the Subdivisional Officer of Supaul and the Subha of Hanumannagar, the Nepalese representative, joined me.

There were three bends in all to be fixed, namely, at pucka pillar No. 14, which had been washed away, and at two points known as "Z" and "X." After re-laying and marking these three points on the ground, I chose convenient sites for their reference pillars. The position of pucka pillar No. 14 was determined by four reference pillars, two of which lie in British territory and two in Nepalese. Of the four pillars locating the position of the point "Z," two fall in the Bhagalpur district and two in Nepal. All the four pillars which fix the bend at "X" are on Nepalese ground.

The true positions of the twelve reference pillars laid down by me were determined by theodolite traverses starting from and closing on stations of either Mr. Berkeley's or Mr. Gasper's work.

The traverse field books were "set up" and the positions of the reference pillars plotted on Mr. Berkeley's 4″ traverse plot of season 1897-98, whence I was able to transfer them to the maps of the Subdivisional Officer and the Nepalese Subha.

The field work and setting up was completed on the 17th November. The following day I pointed out to the Subdivisional Officer and the Subha of Hanumannagar the site, temporarily marked by a bamboo peg, of each of the reference pillars; on our return to camp that afternoon rubakaris were drawn up and signed by each of us.

It was decided that the reference pillars should be of masonry 4 feet square and 3 feet high, into the centre of which a 9′ railway iron was to be built, the base of the iron to be exactly over the bamboo peg. The Subdivisional Officer of Supaul promised to supervise the erection of the reference pillars, each of which was to be marked as numbered by me on his map.

The total expenditure incurred on the work amounted to Rs. 851, and will be met by the Political Department.

CHAPTER III.

PART I.—PROGRAMME OF THE BENGAL SURVEYS DURING 1900-1901.

52. The following statement, based on all the available information at present at my disposal, shows in a tabular form the area which will come under survey in Bengal during season 1900-1901:—

District.	Traverse.	Cadastral with records.	Topographical Surveys.		
			16-inch scale.	4-inch scale.	2-inch scale.
1	2	3	4	5	6
	Sq. miles.	Sq. miles.	Sq. miles.	Sq. miles.	Sq. miles.
Darbhanga	...	563	...	...	...
Monghyr	600	550(*a*)	200(*a*)	...	...
Purnea	750	...	...	...	...
Backergunge	600	...	...	...	...
Sonthal Parganas (Damin-i-koh).	700	...	...	...	...
Singhbhum	600	...	...	...	...
Champaran	90	...	...	...	90(*b*)
,, ...	(*c*)	...	...	...	...
Jalpaiguri	(*d*)	...	...	...	...
Shahabad	(*e*)	...	...	...	...
Noakhali	3 *f*)	...	...	2(*f*)	...
Total ...	3,343	1,113	200	2	90

(*a*) This area consists of 550 square miles "uplands" and 200 square miles diara survey. These figures are, however, only approximate.
(*b*) Cost provided for by Government of India.
(*c*) Relaying old Revenue Survey boundary along a portion of the Bhubsa River. Cost to be provided by the Bettiah and Ramnagar Raj.
(*d*) Relaying of disputed boundary between the Western Duars Government estate and the Baikuntapur estate. Cost to be borne by the Baikuntpur estate.
(*e*) Relaying of boundary marks. Cost to be met by Collector, Shahabad.
(*f*) Completion in survey of one "char" omitted from last season's programme owing to bad weather.

The 563 square miles shown as being for cadastral survey in Darbhanga completes that district. The camp employed on this work will be transferred in October 1901 to the Purnea district, for the cadastral survey of the area traversed during the ensuing season.

The other cadastral section will carry out the detail survey and record-writing of 750 square miles in district Monghyr.

The traverse survey of the Backergunge district having been sanctioned, a detachment will be formed there under Mr. E. F. Berkeley for this work.

Mr. H. Dowman succeeds Mr. Berkeley to the charge of the Sonthal Parganas detachment, which will complete the traverse of the Damin-i-Koh Government estate.

The traverse of the Porahat, Kera and Bandgaon estates in district Singhbhum will be carried out by a detachment under Mr. T. W. Babonau.

Mr. C. S. Gasper, with a small detachment, will complete the area remaining for topographical survey in Champaran.

The relaying of disputed and old revenue survey boundaries in districts Shahabad, Jalpaiguri and Champaran will be performed by surveyors deputed from the Bihar traverse section.

The traverse and topographical survey of one char remaining over from this season's operations in district Noakhali will be completed by a surveyor from the Backergunge detachment.

PART II.—TOURS OF THE SUPERINTENDENT OF SETTLEMENT-SURVEYS.

53. Captain C. W. H. Symonds left no notes as to the exact dates he was on tour. He left Mussoorie for Dinapore on the 21st October 1899, remaining at the latter place till the 4th November, from which date till the 10th March he was, with the exception of a few days, on tour.

Major G. B. Hodgson was on tour from the 12th July to the 27th August, inspecting the two Bihar cadastral sections at Bhagalpur and the Sonthal Parganas detachment at Naya Dumka. He also visited the Bengal Drawing Office twice during the time he was in Calcutta.

Whilst holding temporary charge last March and April, pending the arrival of Major Hodgson, I visited the traverse and one of the cadastral sections.

PART III.—SERVICE OF OFFICERS.

54. Mr. H. Dowman, Extra Assistant Superintendent, 1st grade, with the exception of a couple of months when on privilege leave, has been in charge of the Bihar traverse section for the entire year under report. His management of this section has been all that could be desired. I can fully endorse Captain Symonds' opinion that "he is quite capable of taking charge of a party."

Mr. A. W. Smart, Extra Assistant Superintendent, 4th grade, has been in charge of the cadastral section working in thanas Benipatti and Khajauli of district Darbhanga. His work, as usual, has been of the best. He is a most thoroughly reliable and capable officer. I am much indebted to him for the excellent report he submitted, which I have incorporated in mine, almost word for word.

Mr. C. S. Kraal, Extra Assistant Superintendent, 5th grade, has held charge of the cadastral section in thana Phulparas, district Darbhanga. He is an able cadastral officer, who may always be relied upon to do his utmost for the work, and has his section in good working order.

Mr. E. F. Berkeley, Extra Assistant Superintendent, 6th grade, has had charge of the Sonthal Parganas detachment througout the season. Considering the unhealthiness of the area in which he was working, his outturn of traverse is very good. He has proved himself a most able assistant and has given every satisfaction. His report on the season's operations in the Sonthal Parganas was most complete and excellent, and has been quoted almost literally.

Mr. T. W. Babonau, Extra Assistant Superintendent, 6th grade, was in charge of the traverse and topographical survey in district Noakhali. During the recess season he was attached to the Bihar traverse section. He is an intelligent, painstaking and hardworking assistant.

Mr. C. S. Gasper, Sub-Assistant, Superintendent 1st grade, was attached to Mr. Smart's section throughout the year under report. He is a most able and reliable assistant and a good cadastral officer.

Babu Nilmoni Chatterji, Sub-Assistant Superintendent 1st grade, has been attached to Mr. Kraal's section throughout the year, who reports that Babu Nilmoni Chatterji is an intelligent and hardworking assistant, and has afforded him much aid.

Messrs. H. H. B. Hanby, P. L. Causley, and E. G. Hardinge, Sub-Assistant Superintendents, 2nd grade, have worked well and satisfactorily during the past year.

Mr. A. E. LeFranc, Supervisor, Mr. Kraal reports, has given him every satisfaction.

Mr. L. B. Fitzgibbon was temporarily engaged as a Supervisor, last April, and has worked well during the short time he has been with Mr. Kraal's section.

I have the honour to be,

SIR,

Your most obedient servant,

A. MEARS, CAPT., I.S.C.,

Offg. Supdt. of Settlement-Surveys, Bengal.

APPENDIX I.

Summary of the outturn of work of the Survey Parties in Bengal for the year 1899-1900.

Scale of Survey.	Locale of field operations.		Traversing.						Topographical Survey.		Cadastral Survey.					Number of sheets.	Record-writing.		
	Division.	District.	Number of villages.	Square miles of village survey.	Linear miles.	Number of stations at which the theodolite was set up.	Number of azimuths.	Number of Great Trigonometrical connections.	Number of villages.	Area in square miles.	Number of villages.	Area in square miles.	Number of fields.	Number of linear miles of test survey.	Average size of fields in acres.		Number of villages.	Number of fields.	Area in square miles.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		Temporarily-Settled and Government Estates.																	
16″ = 1 mile ...	Bhagalpur ...	Sonthal Parganas (Damin-i-koh).	920	624	2,348·5	21,823	120	...	...	...	...	...	...	...	...	...	...	...	...
		Private estates.																	
16″ = 1 mile ...	Bhagalpur ...	Sonthal Parganas (Private Estates.)	188	(*f*)135	505·2	3,845	35	1	...	...	...	...	...	...	...	...	...	...	...
16″ = 1 mile ...	Ditto ...	Monghyr	1,059	542	2,223·15	15,906	93	4	...	...	...	...	...	...	...	...	...	...	...
16″ = 1 mile ...	Patna ...	Darbhanga	...	...	(*g*)1,378	(*g*)6,958	...	...	...	...	(*a*)737	917	1,498,210	(*b*)5,173	0·37	1,293	(*a*)599	1,228,595	731
		Miscellaneous.																	
16″ = 1 mile and 64″ = 1 mile.	Patna ...	Darbhanga Municipality ...	...	...	...	...	...	...	...	...	...	...	...	(*d*)...	0·07	(*e*)88	(*c*)52	30,326	4
16″ = 1 mile ...	Do. ...	Shahabad (Semri Estate) ...	13	5	31·68	221	2	...	...	...	...	...	...	...	...	...	...	...	...
		Ditto (Lakhan Dehra) ...	1	2	9·73	58	2	...	...	...	...	...	...	...	...	...	...	...	...
		Ditto (Arrah Town) ...	...	2	51·69	1,518	10	...	...	...	...	...	...	...	...	...	...	...	...
4′ = 1 mile ...	Bhagalpur ...	Monghyr (Relaying of disputed boundary between Government Estates Binda Diara and Banaili Raj Estates).	2	...	72·00	255	2	1	...	...	...	...	...	...	...	...	...	...	...
	Ditto ...	Nepal-Bhagalpur boundary (Fixing sites for reference pillars, &c.).	...	...	15·31	51	...	...	...	...	...	...	...	...	...	...	...	...	...
4″ & 16″ = 1 mile	Chittagong ...	Noakhali (Government Estates).	12	62	214·3	608	24	3	12	6	...	...	...	...	...	...	...	...	...
6′ = 1 mile ...	Benares ...	Ballia (Mauza Jauhi of Dumraon Raj).	1	8	32·64	116	6	...	...	...	1	7	3,084	45·30	1·41	9	1	3,084	7
		Total ...	2,196	1,380	6,882·20	51,359	294	9	12	6	738	924	1,501,294	5,218·30	...	1,390	652	1,262,005	742

(*a*) This difference between the number of villages cadastrally surveyed and khanapuried is due to the reduction of the cadastral programme in thana Khajauli, district Darbhanga.
(*b*) In addition 2,577 partal lines were run in the 64″ village site survey and 832 blocks in village sites were re-surveyed "independently."
(*c*) Town area comprises 23 complete villages and portions of 29 villages.
(*d*) 153 blocks were re-surveyed "independently."
(*e*) On 64″ scale.
(*f*) Includes 20·33 square miles not traversed in detail.
(*g*) Re-laying of lost traverse stations in thanas Benepatti, Khajauli and Phulparas, district Darbhanga.

A. MEARS, *Captain*, s.c.,
Offg. Supdt. of Settlement-Surveys, Bengal.

APPEN

Statement showing the sums expended on each descrip

Description of Work.	TEMPORARILY-SETTLED AND GOVERNMENT ESTATES.												PRIVATE					
	BHAGALPUR DIVISION.				CHITTAGONG DIVISION.				DACCA DIVISION.				BHAGALPUR				BHAGALPUR	
	SONTHAL PARGANAS (DAMIN-I-KOH).				NOAKHALI.				BACKERGAUNGE.				SONTHAL PARGANAS.				MONG	
	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.
	1				2				3				4				5	
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Demarcation	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Stone embedding	1,227	156	55	1,438	...	...	...	...	...	...	...	...	72	9	3	84	1,371	174
Traversing	23,195	2,943	1,045	27,183	5,835	741	263	6,839	298	38	13	349	1,628	207	74	1,909	23,922	3,036
	24,422	3,099	1,100	28,621	5,835	741	263	6,839	298	38	13	349	1,700	216	77	1,993	25,293	3,210
Survey, cadastral	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Completion of field maps ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Area extraction	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Traces	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Record-of-rights (khanapuri)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Completion of records	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Statistics	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Arrears traversing	...	...	...	...	...	...	...	...	...	...	...	...	670	85	30	785	...	...
Do. survey, cadastral ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do. completion of maps ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do. area extraction ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do. traces	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do. khanapuri	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do. completion of records	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Do. statistics	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
"Badar" establishment ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	24,422	3,099	1,100	28,621	5,835	741	263	6,839	298	38	13	349	2,370	301	107	2,778	25,293	3,210

* Inclusive of Rs. 2,534 cost of retraverse of thanas

DIX II.

tion of work in each district in Bengal during season 1899-1900.

ESTATES.

DIVISION.	PATNA DIVISION.															
HYR.	SARAN.					SARAN—DIARA TOPOGRAPHICAL.				DARBHANGA.				MUZAFFARPUR.			
Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.
		6				7				8				9			
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
62	1,607	...	...	...	...	...	...	...	...	32	4	2	38	...	...	...	...
1,078	28,036	...	...	...	...	...	...	...	...	3,376	422	152	3,950	...	...	...	...
1,140	29,643	...	...	...	...	...	...	...	...	*3,408	426	154	3,988	...	...	...	...
...	...	...	...	...	...	...	...	...	...	52,954	6,718	2,387	62,059	...	...	...	...
...	...	...	...	...	...	...	...	...	...	3,592	459	162	4,213	...	...	...	...
...	...	...	...	...	...	...	...	...	...	11,628	1,475	524	13,627	...	...	...	...
...	...	...	...	...	...	...	...	...	...	3,036	391	139	3,616	...	...	...	...
...	...	...	...	...	...	...	...	...	...	71,260	9,043	3,212	83,515	...	...	...	...
...	...	...	...	...	...	...	...	...	...	43,385	5,504	1,955	50,844	...	...	...	...
...	...	...	...	...	...	...	...	...	...	23,726	3,011	1,069	27,806	...	...	...	...
...	...	...	...	...	...	...	...	...	...	8,704	1,104	392	10,200	...	...	...	...
...	...	...	...	...	...	...	...	...	...	75,815	9,619	3,416	88,850	...	...	...	...
...	...	98	12	4	114	...	...	...	...	...	...	...	...	...	...	...	...
...	...	1,992	253	90	2,335	814	105	37	956	7,369	935	332	8,636	78	9	4	91
...	...	3,255	413	147	3,815	50	6	2	58	...	...	...	...	25	4	1	30
...	...	2,727	346	123	3,196	34	4	2	40	3,641	463	164	4,268	2	...	...	2
...	...	1,008	129	46	1,183	10	1	...	11	465	59	21	545	1	...	...	1
...	...	4,084	518	184	4,786	...	...	...	...	2,188	280	99	2,567	23		1	28
...	...	12,518	1,588		14,670	...	...	...	...	14,194	1,800	640	16,634	5	...	...	5
...	...	3,246	412	146	3,804	...	...	...	...	3,077	393	139	3,609	1	...	...	1
...	...	...	...	...	...	...	...	...	...	3,649	463	165	4,277	...	...	...	...
...	...	28,928	3,671	1,304	33,903	908	116	41	1,065	34,583	4,393	1,560	40,536	135	17	6	158
1,140	29,643	28,928	3,671	1,304	33,903	908	116	41	1,065	1,85,066	23,481	8,342	2,16,889	13	17	6	158

enepatti, Khajauli and Phulparas.

APPENDIX

Statement showing the sums expended on each description of work

Description of Work.	PRIVATE ESTATES—*concld.*				MISCELLANE			
	PATNA DIVISION.				PATNA DIVI			
	Champaran Topographical.				Chapra City Survey.			
	Actual cost.	Superintendent and Surveys' pay office,	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent and Surveys' pay office,	Four per cent. cost of instruments.	Total.
	10				11			
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Demarcation	...	...	...	...	...	...	...	...
Stone embedding	...	...	...	...	...	...	...	...
Traversing	917	117	41	1,076	...	...	...	...
	917	117	41	1,076	...	...	...	...
Survey, cadastral	...	...	...	...	...	...	...	...
Completion of field maps ...	...	...	...	...	704	91	32	827
Area extraction	...	...	...	...	66	8	3	77
Traces	...	...	...	...	111	14	5	130
	...	...	...	...	881	113	40	1,034
Record-of-rights (khanapuri)	...	...	...	...	...	...	...	...
Completion of records	...	...	...	...	137	17	6	160
Statistics	...	...	...	...	...	...	...	...
	...	...	...	...	137	17	6	160
Arrears traversing	...	...	...	...	...	...	...	...
Do. survey, cadastral ...	...	...	...	...	...	...	...	...
Do. completion of maps ...	...	...	...	...	...	...	...	...
Do. area extraction ...	...	...	...	...	...	...	...	...
Do. traces	...	...	...	...	...	...	...	...
Do. khanapuri	...	...	...	...	...	...	...	...
Do. completion of records ...	...	...	...	...	...	...	...	...
Do. statistics	...	...	...	...	...	...	...	...
"Badar" establishment ...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...
Total ...	917	117	41	1,076	1,018	130	46	1,194

Description of Work.	PATNA DIVISION.			
	Darbhanga City Survey.			
	Actual cost.	Superintendent of and Surveys' pay office.	Four per cent. cost of instruments.	Total.
	12			
	Rs.	Rs.	Rs.	Rs.
Demarcation	...	...	...	...
Stone embedding	...	...	...	...
Traversing	...	...	...	...
	...	...	...	...
Survey, cadastral	860	109	39	1,008
Completion of field maps ...	912	116	41	1,069
Area extraction	268	34	12	314
Traces	493	63	22	578
	2,533	322	114	2,969
Record-of-rights (khanapuri)	901	115	41	1,057
Completion of records	48	6	2	56
Statistics	20	2	1	23
	969	123	44	1,136
Arrears traversing	...	...	...	...
Do. survey, cadastral ...	...	...	...	...
Do. completion of maps ...	...	...	...	...
Do. area extraction ...	...	...	...	...
Do. traces	...	...	...	...
Do. khanapuri	...	...	...	...
Do. completion of records ...	...	...	...	...
Do. statistics	...	...	...	...
"Badar" establishment ...	...	...	...	...
	...	...	...	...
Total ...	3,502	445	158	4,105

II—*continued.*

in each district in Bengal during season 1899-1900—continued.

OUS—*contd.*

SION—*contd.*

REVISION OF BABU GANESHWAR PARSHAD SINGH'S VILLAGES, DARBHANGA.				PATNA-DIARA VILLAGES.				PATNA TOPOGRAPHICAL DIARA.				DUMRAON RAJ-SHAHABAD BALLIA DISPUTE.			
Actual cost.	Superintendent and Surveys' pay office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent and Surveys' pay office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent and Surveys' pay office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent and Surveys' pay office.	Four per cent. cost of instruments.	Total.
13				14				15				16			
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
171	21	8	200	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
171	21	8	200	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	228	29	10	267	176	22	8	206
...	...	...	...	20	2	1	23	25	3	2	30	25	3	1	29
...	...	...	...	49	6	2	57	7	1	...	8	...	...	...	...
...	...	...	...	10	1	...	11	2	...	...	2	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	62	8	3	73	...	...	...	...	...	...	...	...
...	...	...	...	21	2	1	24	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	162	19	7	188	262	33	12	307	201	25	9	235
171	21	8	200	162	19	7	188	262	33	12	307	201	25	9	235

APPENDIX

Statement showing the sums expended on each descrip

MISCELLANE

PATNA DIVI

Description of Work.	Shahabad-Diara Villages.				Shahabad Topographical Diara.				Shahabad-Kachuar Mahal.			
	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.
	17				18				19			
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Demarcation	...	...	...	...	...	...	...	...	1	...	...	1
Stone embedding	...	...	...	...	...	...	...	...	...	...	...	...
Traversing	...	...	...	...	...	...	...	...	266	34	12	312
	...	...	...	...	...	...	...	...	267	34	12	313
Survey, cadastral	...	...	...	...	...	...	...	...	...	...	...	...
Completion of field maps ...	...	...	...	...	...	...	...	...	...	...	...	...
Area extraction	...	...	...	...	...	...	...	...	...	...	...	...
Traces	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...
Record-of-rights (khanapuri) ...	...	...	...	...	...	...	...	...	...	...	...	...
Completion of records ...	...	...	...	...	...	...	...	...	...	...	...	...
Statistics	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...
Arrears traversing	...	...	...	...	...	...	...	...	...	...	...	...
Do. survey, cadastral ...	255	33	11	299	326	42	15	383	...	...	...	...
Do. completion of maps ...	50	6	2	58	25	3	1	29	...	...	...	...
Do. area extraction ...	29	3	2	34	11	1	1	13	...	...	...	...
Do. traces	8	1	...	9	2	...	...	2	...	...	...	...
Do. khanapur	67	8	3	78	...	...	...	...	...	...	...	...
Do. completion of records	104	14	5	123	...	...	...	...	...	...	...	...
Do. statistics	25	3	1	29	...	...	...	...	...	...	...	...
"Badar" establishment ...	...	...	...	...	...	...	...	...	...	...	...	...
	538	68	24	630	364	46	17	427	...	...	...	...
Total ...	538	68	24	630	364	46	17	427	267	34	12	313

II—*continued.*

tion of work in each district in Bengal during season 1899-1900—continued.

OUS—*contd.*

SION—*concluded.*

SARAN-BALLIA DIARA TOPOGRAPHICA				SARAN-PATNA DIARA.				SHAHABAD-(SEMRI STATE AND LAKHANPUR DEHRA.				SHAHABAD-ARRAH TOWN.			
Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.
20				21				22				23			
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	457	58	21	536	46	6	2	54	164	21	7	192
...	...	...	...	457	58	21	536	46	6	2	54	164	21	7	192
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
150	19	7	176	...	...	...	...	...	...	...	...	...	...	...	...
25	3	1	29	...	...	...	...	...	...	...	...	...	...	...	...
2	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...
1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
178	22	8	208	...	...	...	...	...	...	...	...	...	...	...	...
178	22	8	208	457	58	21	536	46	6	2	54	164	21	7	192

APPENDIX

Statement showing the sums expended on each description of work

MISCELLANE

DESCRIPTION OF WORK.	BHAGALPUR DIVISION—*concld.*								BENARES DIVISION.			
	BHAGALPUR-PURNEA-NEPAL BOUNDARY.				GOVERNMENT ESTATE BINDA-DIARA AND BANAULI RAJ (MONGHYR).				MAUZA JOWHI OF DUMRAON RAJ (BALLIA).			
	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.
	24				25				26			
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Demarcation	726	92	33	851	...	...	...	...	...	...	...	...
Stone embedding	...	...	...	...	...	...	...	...	...	...	...	...
Traversing	...	...	...	...	349	44	16	409	296	38	13	347
	726	92	33	851	349	44	16	409	296	38	13	347
Survey, cadastral	...	...	...	...	...	...	...	...	599	77	27	703
Completion of field maps ...	...	...	...	...	...	...	...	...	40	5	2	47
Area extraction	...	...	...	...	...	...	...	...	19	2	1	22
Traces	...	...	...	...	...	...	...	...	8	1	...	9
	...	...	...	...	...	...	...	...	666	85	30	781
Record-of-rights (khanapuri)...	...	...	...	...	...	...	...	...	469	59	21	549
Completion of records	...	...	...	...	...	...	...	...	55	6	2	63
Statistics	...	...	...	...	...	...	...	...	18	2	1	21
	...	...	...	...	...	...	...	...	542	67	24	633
Arrears traversing	...	...	...	...	...	...	...	...	...	...	...	...
Do. survey, cadastral ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. completion of maps ...	...	...	...	...	...	...	...	...	...	...	...	...
Do. area extraction ..	...	...	...	...	...	...	..	...	...	...	...	...
Do. traces	...	...	...	...	...	...	...	...	...	...	...	...
Do. khanapuri	...	...	...	...	...	...	...	...	...	...	...	...
Do. completion of records	...	...	...	...	...	...	...	...	...	...	...	...
Do. statistics	...	...	...	...	...	...	...	...	...	...	...	...
"Badar" establishment ...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	726	92	33	851	349	44	16	409	1,504	190	67	1,761

II—*concluded.*

in each district in Bengal during season 1899-1900—concluded.

OUS—*concluded.*

ORISSA DIVISION.				BENGAL DRAWING OFFICE.								TOTAL.			
REVISION OF 2" SURVEY OF KUCHILA NAWAGAON (CUTTACK).				BIHAR-BADARS.				ORISSA-KHURDA BADARS.							
Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.
27				28				29				30			
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
...	...	...	...	...	...	...	...	...	...	...	...	727	92	33	852
...	...	...	...	...	...	...	...	...	...	...	...	2,702	343	122	3,167
560	71	25	656	...	...	...	...	...	...	...	...	61,309	7,776	2,762	71,847
560	71	25	656	...	...	...	...	...	...	...	...	64,738	8,211	2,917	75,866
...	...	...	...	...	...	...	...	...	...	...	...	54,413	6,904	2,453	63,770
...	...	...	...	...	...	...	...	...	...	...	...	5,248	671	237	6,156
...	...	...	...	...	...	...	...	...	...	...	...	11,981	1,519	540	14,040
...	...	...	...	...	...	...	...	...	...	...	...	3,698	469	166	4,333
...	...	...	...	...	...	...	...	...	...	...	...	75,340	9,563	3,396	88,299
...	...	...	...	...	...	...	...	...	...	...	...	44,974	5,699	2,025	52,698
...	...	...	...	...	...	...	...	...	...	...	...	23,938	3,040	1,079	28,057
...	...	...	...	...	...	...	...	...	...	...	...	8,722	1,108	394	10,224
...	...	...	...	...	...	...	...	...	...	...	...	77,634	9,847	3,498	90,979
...	...	...	...	...	...	...	...	...	...	...	...	768	97	34	899
...	...	...	...	...	...	...	...	...	...	...	...	11,388	1,447	514	13,349
...	...	...	...	...	...	...	...	...	...	...	...	3,500	443	158	4,101
...	...	...	...	...	...	...	...	...	...	...	...	6,502	824	294	7,620
...	...	...	...	...	...	...	...	...	...	...	...	1,507	191	67	1,765
...	...	...	...	...	...	...	...	...	...	...	...	6,362	810	287	7,459
...	...	...	...	...	...	...	...	...	...	...	...	26,883	3,410	1,213	31,506
...	...	...	...	...	...	...	...	...	...	...	...	6,370	810	287	7,467
...	...	...	...	1,528	193	...	1,721	13,850	1,757	...	15,607	19,027	2,413	165	21,605
...	...	...	...	1,528	193	...	1,721	13,850	1,757	...	15,607	82,307	10,445	3,019	95,771
560	71	25	656	1,528	193	...	1,721	13,850	1,757	...	15,607	3,00,019	38,066	12,830	3,50,915

A. MEARS, CAPTAIN, S.C.,

Offg. Superintendent of Settlement-Surveys, Bengal.

APPENDIX III.

Statement showing the rate per square mile of the several processes of survey in Bengal during season 1899-1900.

Description of Work.	Temporarily-settled and Government Estates.		Private Estates.			Remarks.
	Chittagong Division.	Bhagalpur Division.	Bhagalpur Division.		Patna Division.	
	Noakhali.	Sonthal Parganas (Damin-i-koh).	Sonthal Parganas (private estates).	Monghyr.	Darbhanga.	
	Traverse.	Traverse.	Traverse.	Cadastral.	Cadastral.	
1	2	3	4	5	6	7
	Rs.	Rs.	Rs.	Rs.	Rs.	
Demarcation	...	...	...	...	...	(*a*) Rate included in traversing.
Marking station	...	2·30	...(*a*)	2·97	...	(*b*) Rate for topographical survey included in traversing.
Traversing	100·57 (*b*)	43·56	20·58	51·72	...	
Cost rate traverse ...	100·57	45·86	20·58	54·69	...	
Survey, cadastral	...	...	...	...	67·68	
Completion of field maps ...	...	...	...	...	4·59	
Area extraction	...		...	...	14·86	
Traces	...	...	...	...	3·94	
Cost rate cadastral survey ...	...	...	...	...	91·07	
Record-of-rights (khanapuri)...	...	...	...	...	69·55	
Completion of records	...	...	...	...	38·04	
Statistics	...	...	...	...	13·95	
Cost rate records ...	...	...	...	...	121·54	
Cost rate cadastral and records	...	...	...	...	212·61	

APPENDIX IV.

Return of Inspections of survey and khanapuri by Survey Officers and Inspectors during season 1899-1900.

Number of party.	Division.	District.	Inspecting Officer.	Survey.			Khanapuri.				Remarks.
				Area surveyed in square miles.	Number of villages inspected.	Number of linear miles of test survey.	Number of fields completed in khanapuri.	Number of villages inspected.	Number of entries tested.	Percentage of fields checked.	
1	2	3	4	5	6	7	8	9	10	11	12
No. 4 Party (Bihar)	Patna ...	Darbhanga	Mr. A. W. Smart	916·63	...	1,054	1,228,595	...	...	30	
			,, C. S. Kraal		70	106		28	291		
			,, C. S. Gasper		56	25		135	4,743		
			Babu Nilmani Chatterje...		85	183		69	702		
			Mr. H. H. B. Hanby ...		66	270		78	2,823		
			,, P. L. Causley ...		70	256		103	3,156		
			,, E. G. Hardinge ...		98	322		144	3,271		
			,, A. E. LeFranc ...		77	283		86	1,811		
			Inspectors		1,174	2,674		609	3,41,847		
			Total ...	916·63	1,696	5,173	1,228,595	1,252	3,58,644	30	
	Patna ...	Darbhanga Municipality.	European Assistant and Inspectors.	...	...	...	30,326	52	4,971	16·4	
			Total ...	...	...	...	30,326	52	4,971	16·4	
	Benares, N.-W.P.	Ballia	Mr. P. L. Causley	6·77	1	21	3,084	1	319	40	
			Inspectors			24			935		
			Total ...	6·77	1	45	3,084	1	1,254	40	

A. MEARS, Captain, s.c.,

Offg. Superintendent of Settlement-Surveys, Bengal.

APPENDIX V.

Report showing progress of 2-inch mapping in the Bengal Drawing Office during the year ending 30th September 1900.

Administrative.

Personnel.

Mr. A. B. Smart, Extra Assistant Superintendent, from 1st October 1899.

Permanent Establishment.

6 Draftsmen.

Temporary Establishment.

6 Computers, writers, &c.
5 Draftsmen.

THE superintendence during the year under report was under the Assistant Surveyor-General in charge headquarters Drawing Office.

II. The cadastral maps dealt with during the year were those of districts Muzaffarpur, Champaran, Saran and Darbhanga. Total number of cadastral maps received from the field party during the year was 2,145, and there remained to be dealt with at the close of last year 2,883 maps, making a total of 5,028 maps. Of these, 3,175 were reduced by pentagraph to the scale of 2 inch=1 mile for the preparation of the standard maps, leaving a balance of 1,853 maps to be dealt with during the current year.

Maps dealt with.

II. For Bihar 10 sheets were projected, 12 sheets outlined and 24 sheets completed and finally examined. But owing to the non-receipt of correct spelling list, these sheets were not forwarded for reduction to the scale of 1 inch=1 mile by photography. Of the 60 sheets of district Chittagong, the pentagraphed reductions of 12 sheets were transferred and the outlining and typing of 8 sheets completed, bringing up the total number of sheets of this district, of which the drawing has been completed, to 24.

Publication of standard maps.

Four sheets of Orissa were projected, drawn, examined and reduced by photography to the scale of 1 inch=1 mile during the year under report, the total number of sheets of Orissa, which have now been completed, being 128.

Of the special edition of 26 standard sheets of Orissa on the scale of 2 inch=1 mile, called for by the Government of Bengal, showing the irrigated area of Orissa, 9 sheets were published during the year under report, bringing up the number of sheets published to 18 and leaving a balance of 8 sheets to be published, which have all been forwarded to the photo. office for reproduction.

Owing to numerous corrections to the village names on the standard sheets by the Settlement Department, although the names were taken from the original cadastral maps, it was found necessary to re-type a very large percentage of these names, and have the sheets again reduced by photography, thereby greatly retarding the mapping and delaying the publication of the sheets that had already once been photographed.

The number of villages of North Bihar and Chittagong of which badars remained to be corrected at the beginning of the year under report was 480. Besides these, there were received during the year badars of 668 other villages, making a total of 1,148 villages; of these the maps of 926 villages have been corrected, leaving a balance of 222 villages to be dealt with during the current year.

Badars (Bihar).

Owing to it having been decided at a Conference held at Darbhanga on the 9th April 1900 that the cadastral camps should in future dispose of the attestation and section 103 A badars, instead of these badars being dealt with in the Bengal Drawing Office, the number of Bihar badar estimators in the Bengal Drawing Office was reduced from eight to two men.

At the beginning of the year under report, the number of villages of Orissa, the maps of which remained to be corrected, of which traces had been received from the Settlement Department was 7,607. During the year the traces of 1,907 other villages were received, bringing up the total to be corrected to 9,514; of these 7,214 have been corrected, leaving a balance of 2,310 to be corrected during the current year.

Orissa.

This small number of 2,310 villages will be corrected before the 30th November 1900, by which date it was estimated this work would be completed.

The Orissa badar establishment has gradually been reduced from time to time as the work has been nearing completion, and the men discharged from that establishment have been preparing traces of the Orissa maps which are to be reproduced by zincography.

Zincography.

At the close of the year under report the maps of 358 sheets of Orissa have been zincographed and ten copies of each printed. This work has only very recently been taken in hand.

J. M. FLEMING, *Major*, R.E.,
Offg. Assistant Surveyor-General,
in charge Bengal Drawing Office.

APPENDIX V.

A.

Statement showing cadastral maps received, pentagraphed and remaining to be pentagraphed to 2″ = 1 mile scale during survey year 1899-1900.

Province.	Number of maps received during year ending 30th September 1900.	Number of maps reduced by pentagraph.	Remaining for reduction.	Remarks.
1	2	3	4	5
Orissa ...	...	...	...	
Bihar ...	2,145	(a)2,883 292	1,853	(a) Received during previous years, but reduction made during year under report.
Chittagong ...	...	...	...	

B.

Statement showing progress of 2-inch mapping during 1899-1900.

	Total number of sheets.	Graticules projected.	Stations plotted.	Details reduced by pentagraph and transferred to 2-inch sheets.	Number of villages, streams, &c., typed.	Outlining completed.	Foot-notes, margins, &c., completed.	Examined.	Finally examined.	Sent to Photo Office for reduction to 1-inch scale.	Proofs examined.	Final press order given.
1	2	3	4	5	6	7	8	9	10	11	12	13
Orissa.												
Previously reported	124	124	124	124	124	124	124	124	114	104	104	12
Completed during the year, including Khurda	4	4	4	4	4	4	4	4	4	4	4	12
Total ...	128	128	128	128	128	128	128	128	118	108	108	24
Bihar.												
Previously reported	124	124	118	104	100	92	40	56	48	48	16	...
Completed during the year	32	10	7	11	11	12	32	16	24	...	...	...
Total ...	156	134	125	115	111	104	72	72	72	48	16	...
Chittagong.												
Previously reported	60	60	60	48	...	16	...	...	...	...	...	...
Completed during the year	...	...	...	12	8	8	8	...	...	...	...	...
Total ...	60	60	60	60	8	24	8	...	...	...	...	...

C.

Statement showing maps on scale 2″=1 mile prepared by order of the Under-Secretary to the Government of Bengal in the Irrigation Department in his letter No. 853I., dated 31st July 1893.

Serial number.	Sheet number.	Sections.	Final press order given.	Remarks.
1	2	3	4	5
1	165S.E.	1	1	
2	166N.E.	1	1	
3	192S.E.	1	1	
4	193	4	4	
5	194	4	...	
6	195	4	3	
7	196	4	1	
8	220S.W.	1	1	
9	221N.W.S.W.	2	2	
10	222N.W.S.W.	2	2	
11	223N.W.S.W.	2	2	
	Total ...	26	18	

D.

Statement showing Orissa Badar work done during the year ending 30th September 1900.

	Orissa.				
	Cuttack.	Khurda.	Puri.	Balasore.	Total.
1	2	3	4	5	6
Balance on 1st October 1899	2,719	394	1,763	2,731	7,607
Received during the year	164	217	60	1,466	1,907
Total ...	2,883	611	1,823	4,197	9,514
Corrected during the year	2,747	610	1,795	2,052	7,214
Balance in hand ...	136	1	28	2,145	2,310

E.

Statement showing Bengal and Bihar Badar work done during the year ending 30th September 1900.

	Bihar.		Bengal.			Total.	Remarks.
	Muzaffarpur.	Saran.	Champaran.	Darbhanga.	Chittagong.		
1	2	3	4	5	6	7	8
Balance on 1st October 1899	3	266	4	205	2	480	
Received during the year	...	293	...	278	97	668	
Total ...	3	559	4	483	99	1,148	
Corrected during the year	3	458	4	461	...	926	
Balance in hand	...	101	...	22	99	222	

A. MEARS, Captain, s.c.,

Offg. Superintendent, Settlement-Surveys, Bengal.

W. H. McG.—Reg. No. 5870J—425—5-2-1901.

BOARD OF REVENUE, L.P.

LAND REVENUE DEPARTMENT.

S. & S. BRANCH.

No. 212A.

FROM E. W. COLLIN, ESQ.,
Secretary to the Board of Revenue, L. P.,

TO THE SECRETARY TO THE GOVERNMENT OF BENGAL,
REVENUE DEPARTMENT.

Dated Calcutta, the 28th February 1901.

Member in charge,
THE HON'BLE MR. P. NOLAN.

SIR,

I AM directed to submit herewith the Survey and the Settlement Annual Reports of the Superintendent of Provincial Surveys and the Director of Land Records, Bengal, for the year ending 30th September 1900. The reports were both due to the Board on the 15th December, but the latter reached their office on the 2nd January, and the former so late as the 5th of February last. The Survey Report was written by Captain A. Mears, who was in charge of the office at the close of the year, owing to the illness of Major Hodgson. The final revision of the report appears to have been due to the same cause, as, though dated the 5th December 1900, the printed copy was not received till the 5th February. It was then found necessary to call for further explanations. It is said that the index maps, for illustrating the report, will shortly be submitted. The Board are indebted to the Director of Land Records and the officers under him for their careful reports. The reports of Mr. Kerr, Settlement Officer of Bihar, are specially interesting.

Charge and inspection.

2. Captain C. W. H. Symonds, I.S.C., was in charge of the survey operations from the 1st October 1899 to the 10th March 1900, when, pending the arrival of his successor, Major G. B. Hodgson, I.S.C., he made over charge to Captain A. Mears and proceeded on furlough. Captain A. Mears held charge till 7th April 1900, when Major Hodgson joined and remained in charge till the end of the year. The official designation of the Superintendent of Settlement-Surveys, Bengal, has since the close of the year been changed to "Superintendent of Provincial Surveys, Bengal." The office of the Director of Land Records, Bengal, was held by Mr. P. C. Lyon throughout the year, except for a period of 2 months and 8 days, from 23rd December 1899 to 2nd March 1900, when he was on privilege leave, and Mr. S. L. Maddox, I.C.S., officiated for him. Captain Symonds was on tour from 21st October 1899 to the 10th March, after which Captain Mears was on tour until he went into recess in Mussoorie. Major Hodgson was on tour, from the 12th July to the 27th August. Mr. Lyon spent 113 days on tour, and Mr. Maddox 35 days. These tours contributed greatly to the success of the operations under their charge.

Co-operation of the two Departments.

3. The Survey and Settlement Departments continued to work in harmony, and there was no friction, as reported in the preceding year, between the Survey Department and the kanungos of the Settlement Department deputed to check the *khanapuri*.

Survey programme and outturn.

4. The report of the Superintendent of Provincial Surveys, paragraph 4, shows that his programme was not completely carried out, and the differences have not been clearly explained. In the case of traverse survey, 655 square miles were set down for

traverse in Monghyr, but the actual outturn was 541 square miles. The defect is explained in page 15 to be due to the area of uplands proving less than had been anticipated. In the Sonthal Parganas 624 square miles were traverse-surveyed in the Damin-i-koh estate, against 700 square miles included in the programme, but an additional area of 134 square miles was traversed in the private estates of this district. In Noakhali 62 square miles were traversed, against the area of 50 square miles included in the programme. There was a decrease of 24 square miles in the area included in the programme for cadastral survey, which was due to curtailment of the programme in Darbhanga. There was a decrease of outturn amounting to 206 square miles in the area proposed for *khanapuri*, which was also due to the restriction of the operations in Darbhanga, in accordance with the wishes of the Maharaja and the order of the Government of Bengal, No. 352, dated 5th June 1899. The Survey Department is, therefore, not responsible for the failure to work up to the programme, and the Board are of opinion that the work of the year has been satisfactorily completed.

Expenditure.

5. The results of the year are less satisfactory from a financial point of view. The amount of work done has been considerably less and the cost greater than in preceding years.

The following table compares the figures of the last three years:—

Year.	Traverse survey.	Topographical survey.	Cadastral survey.	Record-writing.	Cost of survey.
1	2	3	4	5	6
	Sq. m.	Sq m.	Sq. m.	Sq. m.	Rs.
1897-98 ...	661	35	1,302	1,302	2,73,994
1898-99 ...	1,727	217	1,298	1,321	2,82,081
1899-1900 ...	1,380	6	924	742	3,50,915

The reasons for the decrease of work have been explained in the preceding paragraph. The report of the Superintendent does not altogether explain the increase of cost. It was partly due to greater difficulties of the work. The cost of traverse survey was high in the Monghyr district, viz., Rs. 55 per square mile, against an average of Rs. 35 in the preceding year for Saran and Darbhanga. The high rate was due mainly to the smallness of the area completed, as explained in paragraph 37 of the report. The traverse survey of the small area in Noakhali cost Rs. 100 per square mile, owing presumably to the difficulties of surveying islands on the sea-coast. In the Sonthal Parganas the work was retarded by sickness among the subsurveyors, and by the obstruction of the hillmen. The cost of cadastral survey in Darbhanga was Rs. 91 per square mile, whereas in 1897-98 it was Rs. 75, and in 1898-99 Rs. 64 per square mile. The fields were about the same size in the three years, but in the year under report they were a little smaller in half the area, and rather larger in the other half. The high rate of cost of survey is attributed, *vide* page 21 of the report, to the reduction of the programme, the disappearance of traverse stations, and the late rains of 1899 which left a large area under water. The same reason explains the high cost of record-writing, which was Rs. 121·5 per square mile, as compared with Rs. 78 in 1897-98 and Rs. 84 in 1898-99. It is to be regretted that the curtailment of the programme and the other causes, which were beyond the control of the Survey Department, should have raised the rates of cost. It was to be expected that, as the work proceeded, economies would have been effected; and it appears that, but for the special causes noted above, the work might have been done at a cheap rate, as no special difficulties arose from the systems of land tenure. These were found to be of a simple character.

The figures given above do not altogether explain how so large a sum as Rs. 3,50,915 was expended during the year. This is an increase of about

Rs. 75,000 over the expenditure of the two preceding years, when there was a larger outturn of work. From the statement in paragraph 7 it appears that considerable arrears of work completed in the preceding survey year remained to be paid for in the year under report. From the statement in this paragraph and from Appendix II it appears that arrears amounting to Rs. 33,903 were paid for work in Saran, and Rs. 36,259 for work in Darbhanga. No explanation is given of these payments, nor has Captain Crichton, to whom a reference was made, been able to account for them satisfactorily. It appears, however, that Captain Symonds, the Officiating Superintendent, was not satisfied with the accuracy of the work done on contract, and withheld payments for the last three months of the survey year, until the work had been tested by the Settlement Department. This appears to the Board to be an unsatisfactory arrangement. If work is done on the contract system, there ought to be a way for testing it at once. Men who are not regularly paid, are not likely to work well.

Miscellaneous.

6. Of minor points affecting the survey, it is satisfactory to notice that the attendance of raiyats during survey and *khanapuri* has been better than in former years, owing to the system of notices explained in the report for the preceding year, and that it has been possible to dispose of a large number of disputes in the field with the help of kanungos deputed by the Settlement Department. According to the report of the Director of Land Records, paragraph 42, 80 per cent. of the disputes were finally and successfully disposed of by the kanungos, while Mr. Kerr states that the decision of the kanungo was found to be correct in 93 per cent. of the disputes decided by this agency (*vide* paragraph 12 of the report on Darbhanga, page liv of the Appendix IVB.) As over 17,000 disputes were raised, it would appear that the great majority must be purely vexatious, and that the number of real disputes is small. It is possible, however, that this is not always the case, and that the parties accept the decisions of kanungos to avoid further trouble. The Superintendent of Provincial Surveys, in paragraph 39 of his report, notes that the inquiries of the kanungos are not always sufficient, and the subject requires constant attention.

Matters subject to further enquiry.

7. The Board are making enquiries on the following subjects:—

(i) The traverse and topographical survey of Char Macpherson in Noakhali, referred to in paragraphs 41 and 42 of the Survey Report;

(ii) The costs recoverable from the Chapra Municipality, referred to in paragraph 45 of the above report; and

(iii) The relaying and marking with permanent marks of village trijunctions in the Saran-Patna diara, at the instance of the Collector of Patna, to prevent encroachments by neighbouring zamindars, referred to in paragraph 46 of the report.

Boundary dispute between Kachnar (private) and Banskati (Government) mahals, Shahabad.

8. The Board are glad to notice that at length the long-disputed boundary between the Kachnar and Banskati mahals in Shahabad has been relaid and the demarcation completed.

Settlement outturn and cost.

9. From paragraph 2 of the Settlement Report it appears that the following progress was made, and expenditure incurred, in settlements under the control of the Director of Land Records, Bengal, during the survey year 1899-1900:—

Area under settlement of revenue or record-of-rights.	Area for which *khanapuri* was completed during 1899-1900.	Area for which records were attested and existing rents recorded in 1899-1900.	Number of tenants whose rents were settled during 1899-1900.	Number of villages for which final records were published in 1899-1900.	Expenditure of the Settlement Department during 1899-1900.
1	2	3	4	5	6
Sq. M.	Sq. M.	Sq. M.			Rs.
7,721	1,386	1,758	93,138	2,374	5,97,294

The figures in column 1 exclude the area of Orissa and the Chittagong districts, in which settlement work was practically completed before the year under report.

Expenditure—Imperial, Provincial and against Deposits.

10. Out of this total expenditure of Rs. 5,97,294, Rs. 2,92,065 represent the cost advanced by the Government of India for the North Bihar settlement operations, Rs. 1,13,341 that incurred by the Provincial Government for settlement of temporarily-settled tracts and Government estates, and Rs. 1,91,888 the expenditure incurred against deposits made by private parties.

Work completed.

11. During the year under review the pending office work in regard to the Orissa and Chittagong settlements was completed, and attestation and draft publication finished for the entire district of Saran. Final publication was also completed for about half of the Darbhanga district, and record-writing in the whole area covered by the Sonthal Parganas private estates.

12. The following statement shows the progress in the preparation and disposal of final reports :—

Final Report.		*Progress.*
1. Orissa	...	Submitted to Government with Board's No. 1304A., dated 7th November 1900.
2. Khurda	...	Submitted to Government with Board's No. 597A., dated 5th May 1900, and treated in Government Resolution No. 2547L.R., dated 20th July 1900. Copy received with Endorsement No. 2643, dated the 25th idem.
3. Chakla Roshnabad	...	Submitted to Government with Board's No. 766A., dated 27th June 1900.
4. Palpara	...	Disposed of with Board's No. 378A., dated 28th November 1900, to Director of Land Records.
5. Gangamandal	...	Disposed of with Board's No. 163A., dated 1st May 1900, to Director of Land Records, and No. 567A., dated 1st May 1900, to Government.
6. Chittagong	...	Printed, but local officers' remarks are awaited by the Director of Land Records.
7. Muzaffarpur	...	Not yet printed.
8. Champaran	...	Printed, but not yet submitted by Director of Land Records with his remarks.
9. Tikari ward's estate	...	Disposed of in Government Resolution No. 2730, dated 30th July 1900. Copy received with Endorsement No. 2805L.R., dated 2nd August 1900.
10. Saran	...	Taken in hand.

Increase of revenue obtained.

13. The results of the revenue assessment in Government and temporarily-settled estates, up to the end of September 1900, as far as can be gathered from the Director's report, are as shown below:—

Locality.	Area.	Previous revenue.	New revenue.	Increase.	Expenditure.	Remarks.
1	2	3	4	5	6	7
	Sq. m.	Rs.	Rs.	Rs.	Rs.	
Noakhali estates ...	48	19,418*	27,882*	8,464*	13,454	*The Board understand these are rentals, and the actual increase of revenue is less than Rs. 8,464, there being settlement-holders in some cases.
Backergunge ,, ...	42	1,26,318	1,41,180	14,862	7,780	
Faridpur ,, ...	23	4,851	8,778	3,927	4,710	
Khulna Sundarbans estates.	5 estates.	9,004	10,597	1,593	1,451†	†Includes, apparently, expenditure on other estates also.

14. The Settlement Office in Orissa was closed at the end of March 1900, and the work which remained was made over to the Commissioner's Personal Assistant. This is nearly finished, but there still remains something to be done before the Personal Assistant can be finally relieved of this additional work. The boundary disputes between the Tributary States and British territory were disposed of, and *kabuliyats* taken from the proprietors of all estates, except the five *killajat* estates, for which the *kabuliyats* were prepared and sent to Collector for execution by the proprietors. The six estates of which the proprietors have proved recusant have also been taken under khas management.

Orissa.

A revised estimate for the pending work in Killas Darpan and Aul has been submitted to Government with the Board's letter No. 97A., dated 28th January 1901, and the scheme for the apportionment of costs in pargana Derabisi of Killa Aul, referred to in paragraph 54 of the Director's report, has since been sanctioned in Government Order No. 550, dated 30th January 1901.

15. The pending office work in Chittagong, including the classification and copying of the records, was completed, and the work of computation of costs to be recovered in the permanently-settled areas has also been practically finished. The Director says that the work of recovery is one of considerable difficulty, and will be exceptionally costly, though he does not say why this should be so. Experience shows that in Bihar recoveries are easy, whereas in Bengal they are made with difficulty. No orders have yet been passed as to the maintenance of the records of this settlement, and it is understood that the question is being considered with that of the Orissa and Bihar records.

Chittagong.

16. No special remarks are called for on the minor operations conducted in the areas noted on the margin, except that a considerable increase of Government revenue was obtained in Faridpur and Noakhali by the assessment of new cultivation. In the Sundarbans area the increase of revenue was small, but it was found necessary to annul the tenures created since the last settlement.

Government and temporarily-settled estates in Noakhali, Faridpur, Backergunge, and the Khulna Sundarbans.

17. The settlement operations of North Behar are proceeding smoothly. They have been completed in the Muzaffarpur and Champaran Districts, and at the close of the year the work was concluded in Saran, except for the final publication and disposal of case work in an area of 526 square miles. The work of the year included the attestation and publication of the draft records of an area of 526 square miles, which was completed, in spite of difficulties owing to the prevalence of plague, and the complications of proprietary rights. In Darbhanga, the programme included the attestation of 680 square miles, but in November the work was curtailed owing to want of funds and the attestation of 317 square miles was completed. Final publication of the records has been completed of 1,664 villages out of 3,440, and it is hoped to clear off arrears by the end of the present year. The curtailment of the survey programme, however, will delay the conclusion of the operations in this district until 1902, *i.e.*, for a year.

North Bihar.

18. Mr. Kerr points out that the Bengal Tenancy Amendment Act of 1898 has greatly facilitated the preparation of records-of-rights, and has enabled the Settlement Officers to practically double their outturns. On the other hand, it appears that the new procedure, by which the publication of the draft record is made before receiving applications for settlement of fair rents and parties have to file their objections almost immediately after attestation, has increased the number of objections filed under section 103A. This subject is dealt with in paragraph 37 of the Director of Land Records' report. The question for consideration is whether disputes are properly inquired into at the time of attestation. In Saran, out of 17,086 objections under section 103A, 39 per cent. were allowed. The percentage was specially increased by the bad work of one Assistant Settlement Officer. The Board cannot altogether agree with Mr. Kerr that this result, by itself, shows the care with which attestation was done. In Darbhanga the results are not clearly shown, but in regard to disputes about rent, it is stated that 50 per cent. of the objections were allowed. In the Board's opinion, however, the attestation should not be

Objections.

judged merely by the number of objections under section 103A, which are upheld. Consideration should be had to the number of objections filed after attestation, and the following figures are extracted from the present report :—

District.	Number of holdings attested.	Number of objections under section 103A.	Percentage of column 3 on column 2.	Percentage of objections allowed.	Remarks.
1	2	3	4	5	6
Saran ...	260,059	17,086	6·4	39	The figures in column 2 are taken from statement V, page XXXVIII.
Darbhanga ...	141,772	13,877	9·7	50	The figures in column 2 are taken from statement VII, page LXIV.

The percentage in the case of Darbhanga is for objections as to rent, which were the more numerous. In the case of other objections the percentage of objections allowed was 40.

The Board are of opinion that these figures (added to the fact reported in the case of Darbhanga, that 75 per cent. of the rents were disputed at the time of attestation) show that this branch of the work is carefully done.

Disputes.

19. It is to be noticed that the disputes regarding possession were 44 per cent. of the whole number in Saran, and only 27 per cent. in Darbhanga. In the latter district, the main disputes are in regard to rents. Other disputes were of a minor character, and were mostly disposed of by the kanungos at the time of record-writing. Disputes as to rents were, as was anticipated in this district, more serious, and I am to invite attention to paragraph 9 of the report of Mr. Kerr on the district of Darbhanga, on pages LII—LIII of Appendix IVB, as to the devices of unscrupulous landlords to enhance rents. From the remarks in paragraph 6 of the same report, pages XLIX—L, it is evident that further difficulties will arise during the current season in regard to rents. There were, comparatively, few applications for settlement of fair rents, and it is reported that, up to date, there have been such applications in respect of only 1 per cent. of the total number of holdings in Darbhanga. The enhancement given in Saran amounted to 5·74 per cent., and that in Darbhanga during the year under report was less than 9 per cent. Enhancement was mainly granted on the ground of increase of cultivation. There are, however, indications that landlords do not rely upon the enhancement sections only to obtain an increase of rents. From Mr. Kerr's report, Appendix IVB, page LIII, it appears that landlords are obtaining agreements for enhanced rents previous to attestation, and from paragraph 21, page LVII, of the same report, it will be seen that the Appellate Court has, in one instance, accepted a compromise which had the effect of upholding an enhancement in excess of the maximum allowed by law. The Advocate-General considers that the action of the Court was right.

Status of raiyats.

20. There were few disputes as to the status of raiyats. In Saran over 80 per cent., and in Darbhanga 98·8 per cent. of the raiyats have occupancy rights. The latter figures appear to refer to the raiyati area, and the former to the total area. It is remarkable that, in one village near Sonepore in the Saran district, not far from the spot where so much discussion of the Tenancy Act took place, the raiyats were still ignorant of the rights secured to them by the law passed 15 years ago. In both districts the area of proprietor's private lands was very small, but the area in the possession of the landlords was 3·6 per cent. in Saran, and 12 per cent. in Darbhanga. Difficulty continues to be experienced in settling disputes which arise as to rights in these lands.

21. From the statistics collected as to the transfer of occupancy rights, it appears that out of holdings attested during the year, 17·48 per cent. were transferred by sales and mortgages in Saran, and only 5·99 per cent. in Darbhanga. Of the same transfers, 13·2 per cent. went to the money-lending class in Saran and 11 per cent. in Darbhanga. No explanation is offered of the difference in the price of holdings in the two districts. In Saran a holding fetches Rs. 84 an acre, and in Darbhanga Rs. 40. The difference between mortgages is more remarkable, viz., Rs. 98 in Saran against Rs. 29 in Darbhanga. It is also to be noticed that the price of proprietary rights is not higher than that of occupancy rights in either district; but, as statistics are only collected from a few villages, the figures may not be true of the whole district.

Transfers of occupancy holdings, &c.

22. The result of the recovery of costs in North Bihar, as can be gathered from the report, is shown in the subjoined table :—

Recovery of cost.

District.	Total demand up to end of 1899-1900.	Recoveries.		Balance.	Percentage of recoveries.	Percentage of cost.	Remarks.
		In 1899-1900.	Total.				
1	2	3	4	5	6	7	8
	Rs.	Rs.	Rs.	Rs.			
Saran ...	*5,50,693	1,90,787	5,32,387	18,306	95·63	5·6	*Exclusive of share due from Government.
Darbhanga ...	1,40,006	1,38,040	1,38,040	1,966	98·5	7·1	

The Board agree with the Director of Land Records that the work of recovery has been exceptionally successful. It is probable that the cost will be reduced in Darbhanga in the current year. The results compare very favourably with those of Chakla Roshnabad in Tippera, where 75 per cent. of the demand was collected at a cost of 17 per cent., and those of Chittagong where about 25 per cent. was collected. It is not stated whether the balances shown in the previous year to be recovered in Muzaffarpur and Champaran have since been recovered. It is understood that they are still under recovery under the Collectors.

23. Notice has been taken of the settlement of Killas Aul and Darpan, in Cuttack, in paragraph 14 above, and the work done in the other private estates was, on the whole, good.

Petty Private Estates in Faridpur, Backergunge, &c.

24. The Board have no control over the settlements in the Sonthal Parganas mentioned in paragraph 57 of the Settlement Report.

Settlement work not under Board's control.

25. The Director has enumerated in paragraph 6 of his report the new settlements undertaken under the orders already received and those proposed to be taken up. The Board's report on the undertaking of the Panga settlement in Rangpur has been submitted with their letter No. 179A., dated 15th February 1901. The further reports called for in connection with the Kalimpong settlement in Darjeeling in Government order No. 1861, dated 4th April 1900, were also submitted in the correspondence ending with the Board's letter No. 28A., dated 8th January 1901. The orders of Government on the Board's No. 1357A., dated 17th November 1900, regarding re-settlement of the Koderma estate in Hazaribagh, are awaited.

New settlements sanctioned and proposed.

26. From paragraph 22 of the Survey Report and paragraph 11 of the Settlement Report, it appears that 17 junior civilians were instructed during the year in the use of the theodolite and learnt survey and record-writing, and that 18 officers were trained in settlement work in the camps in Darbhanga, organised by the Settlement Officer, North Bihar. It is satisfactory that the subject continues to receive attention.

Training of Junior Civilians.

27. In view of Government Order No. 616T.—R., dated 22nd June 1899, the Board have called for a detailed scheme from the Director of Land Records on the subject mentioned in the margin, and are awaiting his report.

Scheme for the speedy disposal of the survey and settlement of chars, diaras, and petty estates.

28. The Board agree with Mr. Lyon in thinking that Messrs. Kerr and McPherson have done excellent work, and that Messrs. Coupland, Cobden-Ramsay, and Gourlay have also rendered good service. They also concur generally with his remarks on the services rendered by the other officers mentioned in paragraph 63 of his report.

Merits of officers.

29. The Board are glad to notice that Messrs. W. C. Macpherson, Grouse and Wheeler assisted the Settlement Department in the settlement operations in their district. They desire to thank Captains Symonds and Mears and Major Hodgson for the assistance given to the officers of the Settlement Department. They are also indebted to Captain Mears for the submission of the Annual Report. Mr. Lyon's services have, as in the preceding year, been of the greatest value, and the Board are glad, again, to bring them prominently to the notice of Government.

I have the honour to be,

SIR,

Your most obedient servant,

E. W. COLLIN,

Secretary.

No. 21A.

COPY forwarded to the Superintendent of Provincial Surveys, Bengal, with reference to his No. $\frac{2655}{\text{E.}-7-103}$, dated 5th December 1900, for information.

2. His special attention is invited to paragraph 7 above, and he is requested to submit a special report on point (iii) therein.

By order of the Board of Revenue, L. P.,

E. W. COLLIN,

Secretary.

CALCUTTA,
The 28th February 1901.

C. W. & others—Reg. No. 8374J—425—2-3-1901.

REVENUE DEPARTMENT.

LAND REVENUE.

CALCUTTA, THE 11TH APRIL 1901.

RESOLUTION No. 1844L.R.

READ—

Letter No. 212A., dated the 28th February 1901, submitting the Survey and Settlement Reports for the year ending 30th September 1900.

The Annual Survey and Settlement Reports, which were due to Government on the 15th of January, were received from the Board on the 7th March. This delay was caused by the illness of the Superintendent of Surveys. The Lieutenant-Governor agrees with the remarks which the Board have made regarding the good work done by the tours and inspections of the officers in charge. He is glad to learn that the Survey and Settlement Departments have worked in harmony during the past year, and that the rules framed as to the relations between the Survey Department and the kanungos of the Settlement Department have effectually removed the friction of last year.

2. His Honour notices that the survey programme was not carried out in its entirety, but the explanations given for this are not very clear. The upland area of North Monghyr turned out to be considerably less than was originally estimated. The programme was still further affected, more as regards *khanapuri* than cadastral survey, by the order for the curtailment of operations in Darbhanga. The Orissa and Chittagong Settlements have been brought to a successful end, but in Chittagong the recovery of survey costs has still to be completed. The programme of the year's work in the Noakhali Government Estates has been completed with the exception of one estate, Chakla Bamni. In Backergunge no fresh work was taken up in view of the pending settlement of the whole district. In Saran the programme was, despite various difficulties, successfully carried out. The Lieutenant-Governor regrets that wrongly-framed budget estimates should have caused the curtailment of the programme in Darbhanga. In the case of the settlement of private estates in the Sonthal Parganas, the programme was a heavy one, and though excellent progress was made, it was found impossible to complete it. The inference is that the programme must have been excessive. The expenditure incurred on survey has been high as compared with previous years, one of the chief causes being the curtailment of the programme in the Darbhanga district, a result which was foreseen when the orders for curtailment were passed. The chief cause, however, is to be found in the payment of charges, rightly debitable to the previous year, having been paid in this, regarding which the Lieutenant-Governor entirely agrees with the stricture passed by the Board, for the system is financially and administratively wrong. The Lieutenant-Governor notices with pleasure the good work done by the kanungos in the disposal of *khanapuri* disputes.

3. He has read with interest the report of the Settlement Officer of Bihar with regard to the effect of the Bengal Tenancy Amendment Act in facilitating the preparation of a record-of-rights, but he agrees with the Board that expedition may be overdone and that in some cases greater care was required at the time of attestation. The Board are right in saying that the attestation should not be judged merely by the number of objections under section 103A which are upheld, but that it should be rather judged by the number of objections filed after attestation, and by this standard it appears that the attestation work has, on the whole, been carefully done.

4. The Lieutenant-Governor notices the difficulties that have beset the operations in Darbhanga, owing to the oppressive and unscrupulous action of certain landlords, with which, however, the Settlement Officer has fortunately been able to cope. The illustrations given in paragraph 9 of Mr. Kerr's report show the necessity of unfailing vigilance and scrutiny in the examination of all rent claims. He trusts that the case reported of rewriting the *jamabandi* from the village map, after having the areas extracted, will not become common, but it is very evident that the acceptance of the rent statements of the landlords of this district require the most careful scrutiny. The Settlement Officer of

Bihar has reported a case in which the Assistant Settlement Officer dismissed a claim for rent as illegal under section 29, Bengal Tenancy Act. It appears that the raiyats had filed a petition agreeing to the rent claimed, but as it was illegal, the officer rejected it. On appeal to the Special Judge, the compromise was accepted, and the Advocate-General has recorded that, in his opinion, the decision of the Court was right. This is an important ruling, and a copy of the judgment and opinion should be sent for the information of Government. The Lieutenant-Governor has read with interest the remarks of the Settlement Officers on the transfers of occupancy rights in Saran, Darbhanga, and the Sonthal Parganas. In the first two districts, the percentage of transfers is 7·87 and 2·44, respectively, over a period of ten years, and in neither does there appear at present to be any fear that the professional money-lending class is to any serious extent acquiring occupancy rights to the detriment of the actual cultivators. In Darbhanga the landlords, it is stated, do their best to prevent the professional money-lender from getting any footing in their villages. The statistics given for the Sonthal Parganas, show clearly that, even without any village supervising agency, the orders of 1887 prohibiting sales have been very fairly obeyed, and there is every reason to think that the action now being taken by the Settlement Officer with reference to transfers will confirm the impression that the endeavour to evade them is futile. The efforts made by Government to protect the peasantry of the Sonthal Parganas from the devices of the money-lenders have been hitherto successful. His Honour notices the comparative ease and rapidity with which recoveries have been effected in Bihar, as compared with similar work in the wealthy districts of Chittagong and Tippera, where the percentage of recovery has been much lower and the cost correspondingly higher. The reason may, perhaps, be found in the anxiety of the poorer raiyat of Bihar to possess that which may safeguard him in the possession of his lands.

5. The Lieutenant-Governor thanks the Board and Mr. Lyon for their careful and capable supervision of the settlement operations of the Province. He acknowledges the great assistance given by the Survey Officers to the Settlement Department, and the thorough and careful work of Messrs. Kerr and McPherson.

ORDER—Ordered that this Resolution be published in the *Calcutta Gazette*, and that a copy of it, with copies of the two Reports, be submitted to the Government of India.

By order of the Lieutenant-Governor of Bengal,

F. A. SLACKE,

Secy. to the Govt. of Bengal.

No. 1845L.R.

COPY, with a copy of the Survey Report, forwarded to the Deputy Surveyor-General in charge, Revenue Branch, Survey of India, for information.

No. 1846L.R.

COPY, with a copy of the Report of the Director of Land Records, forwarded to the Appointment Department of this Government for information, with special reference to paragraph 5.

No. 1847L.R.

COPY forwarded to the Secretary to the Board of Revenue, Land Revenue Department, for the information of the Board, with reference to his letter No. 212A., dated the 28th February 1901, and for communication to the Director of Land Records, the Superintendent of Provincial Surveys, Bengal, all Commissioners of Divisions, District Officers and Settlement Officers.

By order of the Lieutenant-Governor of Bengal,

L. E. B. COBDEN-RAMSAY,

Offg. Under-Secy. to the Govt. of Bengal.

CALCUTTA;
REVENUE DEPT.—*Land Revenue*,
The 11th April 1901.
Reg. No. 8003C of 1900-1901.
J. B. K.—Reg. No. 17C—1,019—12-4-1901.

BY ORDER OF THE LIEUT
16.APR.190
FORWARDED *

ANNUAL REPORT

ON THE

SURVEY OPERATIONS IN BENGAL

DURING THE YEAR

1900-1901.

From 1st October 1900 to 30th September 1901.

LIBRARY
OF THE
BOMBAY
BRANCH
OF THE
ROYAL ASIATIC SOCIETY.

Calcutta:
PRINTED AT THE BENGAL SECRETARIAT PRESS.
1901.

Published at the BENGAL SECRETARIAT BOOK DEPÔT,
Writers' Buildings, Calcutta.

OFFICIAL AGENTS.

In India—

THACKER, SPINK & Co., Calcutta.
W. NEWMAN & Co., Calcutta.
THACKER & Co., Bombay.
HIGGINBOTHAM & Co., Madras.
SUPERINTENDENT, AMERICAN BAPTIST MISSION PRESS, Rangoon.
E. SEYMOUR HALE, 53 Esplanade Road, Fort Bombay.
RAI SAHIB M. GULAB SINGH & SONS, Proprietors of the Mufid-i-am Press, Lahore, Punjab.
MESSRS. COMBRIDGE & Co., Bombay.

In England—

E. A. ARNOLD, 37 Bedford Street, Strand, W.C., London.
CONSTABLE & Co., 2 Whitehall Gardens, S.W., London.
SAMPSON LOW, MARSTON & Co., St. Dunstan's House, Fetter Lane, E.C., London.
P. S. KING & SON, 2 & 4 Great Smith Street, Westminster, London.
LUZAC & Co., 46 Great Russell Street, W.C., London.
KEGAN PAUL, TRENCH, TRÜBNER & Co., Charing Cross Road, W.C., London.
B. QUARITCH, 15 Piccadilly, W., London.
WILLIAMS & NORGATE, Oxford.
DEIGHTON BELL & Co., Cambridge.

On the Continent—

FRIEDLÄNDER & SOHN, 11 Carlstrasse, Berlin.
OTTO HARRASSOWITZ, Leipzig.
KARL W. HIERSEMANN, Leipzig.
ERNEST LEROUX, 28 Rue Bonaparte, Paris.
MARTINUS NIJHOFF, The Hague.

INDEX TO CONTENTS.

CHAPTER I.

		Page.
GENERAL REMARKS ON THE PROVINCIAL SURVEYS	.	2

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND RECORDS OF RIGHTS IN TEMPORARILY-SETTLED TRACTS AND GOVERNMENT ESTATES UNDER SETTLEMENT OF RENTS AND LAND REVENUE.

BHAGALPUR DIVISION.	SONTHAL PARGANAS	GOVERNMENT ESTATE (DAMIN-I-KOH.	8

PART II.—REPORTS ON SURVEYS AND RECORDS OF RIGHTS IN PRIVATE ESTATES.

BHAGALPUR DIVISION	MONGHYR DISTRICT	TRAVERSE SURVEY	. . .	9
	„ „	CADASTRAL „	. . .	10
	„ „	TOPOGRAPHICAL „	. . .	12
PATNA DIVISION.	PATNA „	TRAVERSE „	. . .	*ib.*
	„ „	CADASTRAL „	. . .	*ib.*
	„ „	TOPOGRAPHICAL „	. . .	13
	DARBHANGA „	TRAVERSE „	. . .	*ib.*
	„ „	CADASTRAL „	. . .	*ib.*
BHAGALPUR DIVISION	PURNEA „	TRAVERSE „	. . .	14
PATNA „	GAYA „	MAKSUDPUR ESTATE—TRAVERSE	.	15
RAJSHAHI „	BACKERGUNGE „	TRAVERSE SURVEY	. . .	16
	„ „	CADASTRAL „	. . .	17
CHOTA NAGPUR „	SINGHBHUM „	TRAVERSE „	. . .	*ib.*

PART III.—REPORTS ON MISCELLANEOUS SURVEYS.

CHAMPARAN DISTRICT	TRAVERSE SURVEY	. .	18
„ „	TOPOGRAPHICAL „	. .	19
„ „	BHABSA RIVER DISPUTE	. .	*ib.*
DARBHANGA „	MADHUBANI MUNICIPALITY	.	*ib.*
JALPAIGURI „	BAIKANTAPUR BOUNDARY	. .	20

PART IV.—REPORT ON THE BENGAL DRAWING OFFICE.

STANDARD MAPPING SECTION	. . . . .	21
BIHAR "BADAR" „	. . . . .	22
THANA MAPPING „	. . . . .	*ib.*
REPRODUCTION OF VILLAGE MAPS	. . . . .	23
ORISSA "BADAR" SECTION	. . . . .	*ib.*

CHAPTER III.

PART I.—PROGRAMME OF BENGAL SURVEYS FOR 1901-1902	. . . . .	24
„ *II.*—TOURS OF THE SUPERINTENDENT OF PROVINCIAL SURVEYS	. .	*ib.*
„ *III.*—SERVICES OF OFFICERS	. . . . .	*ib.*

*

LIST OF APPENDICES.

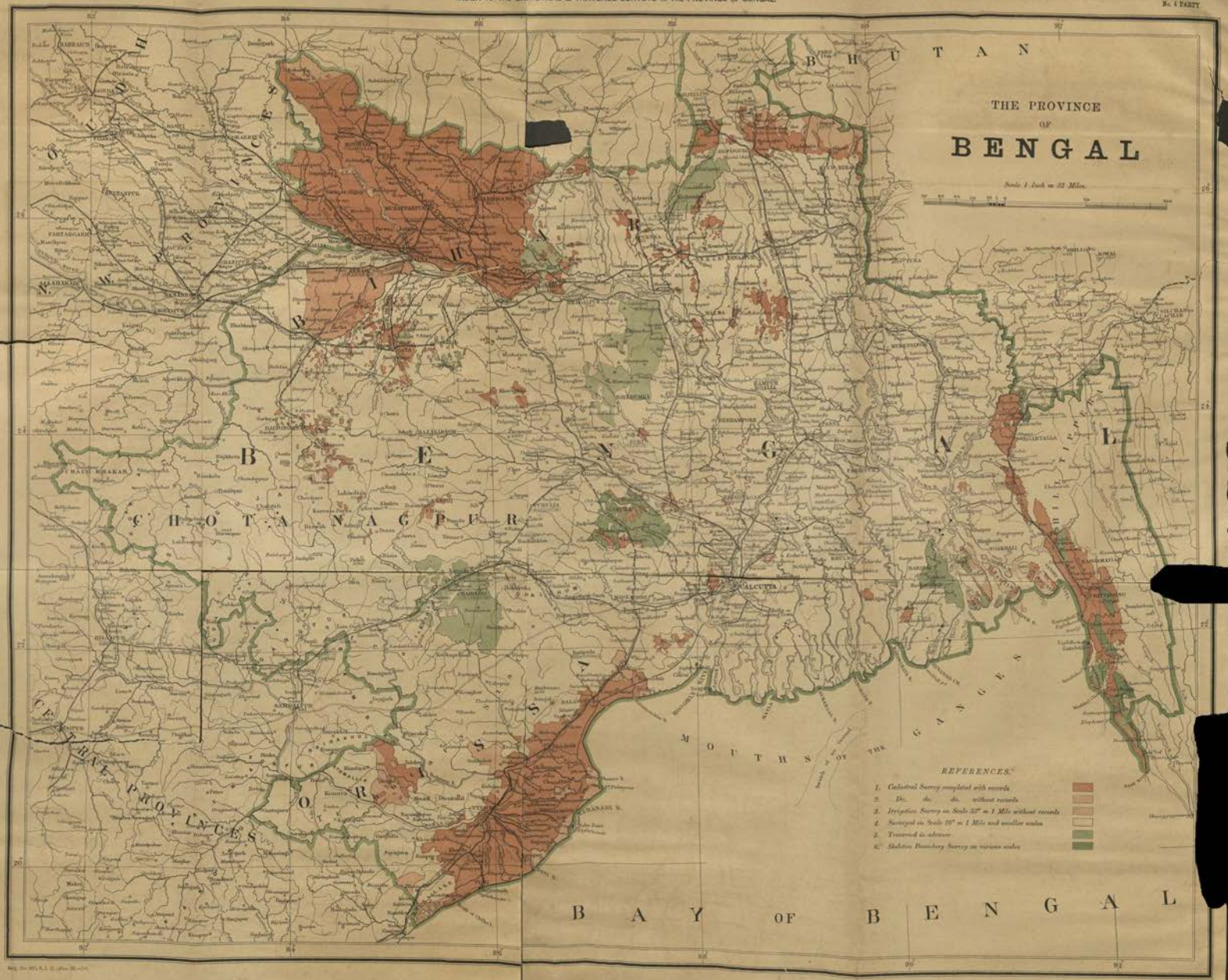
		Page.
APPENDIX	*I.*—OUTTURN STATEMENT	27
	II.—EXPENDITURE STATEMENT	28

LIST OF INDEX MAPS.

PROVINCE OF BENGAL	*To face page*	1
SONTHAL PARGANAS DISTRICT	„ „	8
MONGHYR AND PATNA „	„ „	12
DARBHANGA „	„ „	13
PURNEA „	„ „	14
GAYA „	„ „	*ib.*
BACKERGUNGE „	„ „	16
SINGHBHUM „	„ „	17
CHAMPARAN „	„ „	18

BENGAL SURVEY.

INDEX TO THE CADASTRAL & TRAVERSE SURVEYS IN THE PROVINCE OF BENGAL.



No. 521-S. 95.

CHAPTER I.

General Remarks.

Outturn of work and expenditure.

2. The outturn of work accomplished is given in detail in Appendix I of this report.

The following tabular statement gives the outturn in square miles:—

Division.	District and estate.	Traverse survey.	Cadastral survey.	Record-writing.	Topographical survey.
1	2	3	4	5	6
Temporarily-settled and Government Estates.					
Major settlements.					
Bhagalpur	Sonthal Parganas (Damin-i-koh Government estate).	735(*a*)	...	...	...
Private Estates.					
Major settlements.					
Bhagalpur	Monghyr	747	741	729	26
Patna	Patna	60	56	56	11
	Darbhanga	64(*b*)	413	597(*c*)	...
Bhagalpur	Purnea	728	...	...	...
Patna	Gaya (Maksudpur estate) ...	128	...	...	...
Dacca	Backergunge	608	33	33	...
Chota Nagpur	Singhbhum (Porahat, Kera, Chainpur, and Bandgaon Estates).	540	...	...	...
Miscellaneous.					
Patna	Champaran	84	...	...	84
	Darbhanga (Madhubani Municipality).	1	1	1	...
Rajshahi	Jalpaiguri (Baikantapur estate boundary survey).	...(*d*)	...	...	...
	Total ...	3,695	1,244	1,416	121

(*a*) Includes 166 square miles of jungle blocks and Pa[illegible] also 2 square miles surveyed in the area returned as jungle blocks last season.
(*b*) Retraversing to relay stations of 1895 lost.
(*c*) The excess of record-writing over survey is on account of completion of the area surveyed only during previous season.
(*d*) Traversing of 97 linear miles for demarcation purposes.

A comparison of the outturn with the programme, as originally sanctioned, shows the following differences:—

(*a*) In Monghyr 147 square miles more than was originally intended have been traversed. In cadastral survey 191 square miles and in record-writing 179 square miles more than was anticipated have been accomplished. In topographical survey 175 square miles less than was anticipated has been dealt with.

(*b*) In Patna 60 square miles, for which no allowance was originally made, have been traversed in the *diara* area adjoining the Monghyr district. Also 56 square miles of cadastral survey with records and 11 square miles of topographical survey, for

neither of which any allowance had been made, have been accomplished.

(*c*) In the Sonthal Parganas the area traversed exceeds the programme by 35 square miles.

(*d*) In Backergunge the area traversed exceeds programme by 8 square miles and 33 square miles of cadastral survey with records, which were added to the programme in the middle of the season, have been accomplished.

(*e*) In the Maksudpur estate the traverse area has proved to be 22 square miles less than that originally reported as for survey.

(*f*) In Purnea the traverse area of the Surjapur pargana has also proved to be 22 square miles less than that originally reported.

(*g*) In Darbhanga the cadastral area has proved to be 31 square miles more than was anticipated.

(*h*) In Singhbhum the original programme, before the addition of Anandapur, was 595 square miles, of which 540 have been accomplished.

The foregoing are the only differences of any importance. As regards (*a*), there was a misunderstanding between the Survey and Settlement Departments as to the programme in Monghyr. The Settlement Department was under the impression that the survey and record-writing of North Monghyr and its adjoining *diara* tract would be completed by October 1902, but the survey programme made this quite impossible. The above fact having been pointed out, the Board approved of the revised programme. The difference between the cadastral and topographical areas, as originally estimated and actually accomplished, is due to the fact that, owing to the changes in the course of the Ganges river, it is impossible to state, until the traverse survey has been accomplished, how much area must be undertaken, in order to comply with the orders to survey up to the southern high bank. Again, even when this stage has been arrived at, it rests with the Settlement Department (guided, of course, by the rules as to survey of Government estates and villages partially and entirely included in the *diara* tract) to direct how much of the *diara* area is to be surveyed cadastrally and how much topographically.

As regards (*b*), the areas surveyed in district Patna, the foregoing remarks also apply, as this tract has been dealt with in connection with the Monghyr *diara* work, and my predecessor could not possibly have foretold that the southern high bank of the Ganges would extend so far into the Patna district.

The other differences in the traverse areas in Backergunge and Purnea and the cadastral area in Darbhanga are due to the programmes only giving approximate areas for the tracts to be surveyed. The extra cadastral area in Backergunge was sanctioned by Government during the course of the field season.

In Singhbhum the traverse survey of the Anandapur estate was sanctioned after the original programme had been approved, but owing to the ill-health of the establishment, and owing to the great proportion of the establishment having only lately been trained, it was impossible to deal with this further area, and I was unable, owing to the pressure and greater urgency of traverse surveys elsewhere in Bengal, to supplement the establishment during the field season.

The foregoing remarks show that the programme has been adhered to in full in all districts except Singhbhum, and the grand total of the area accomplished in Bengal exceeds the total of the original programme by 151 square miles of traverse, 311 square miles of cadastral survey, and 299 square miles of record-writing. Against these figures, there is only a minus quantity of 164 square miles of topographical survey which is a very small deficit when compared against the plus items, more especially so as the cost and intricacy of topographical work is far less than that of cadastral.

3. The expenditure incurred during the year is given in Appendix II, and the following statement shows the cost rate per square mile for each class of work, inclusive of shares of the controlling office and the 4 per cent. charge for instruments. Under the recent orders of the Government of

India, the charge, for instruments is not made against the following survey operations, the expenditure of which falls under the head of Imperial, viz.,. Singhbhum and Champaran :—

District.	Cost rate per square mile.			
	Traverse.	Cadastral.	Record-writing.	Topographical survey.
1	2	3	4	5
	Rs.	Rs.	Rs.	Rs.
Sonthal Parganas	55·4	...	...	...
Monghyr and Patna	29·4	70·9	58·2	16·0
Darbhanga	...	94·0	95·2	...
Purnea	38·4	...	...	...
Gaya-Maksudpur estate	39·8	...	...	...
Backergunge	75·2	...	...	...
Singhbhum	55·9	...	...	...
Champaran	46·2	...	...	61·3

The cost rate for traversing in the Sonthal Parganas, viz., Rs. 55·4 per square mile, is high, but this is due to the very difficult nature of the country in the Damin-i-koh and to the great amount of sickness amongst the establishment.

The traverse cost rate of Rs. 29·4 per square mile for Monghyr and Patna is satisfactory, and is due to the large area accomplished by the North Bihar traverse section and the consequent low incidence of cost of control per square mile. The rate of Rs. 129·1 per square mile for cadastral survey and records in Monghyr and Patna is satisfactory, and compares well with the cost-rates of previous season's work in Bihar. The low rate is attributable to the large area accomplished, viz., 797 square miles and to the larger size of the average field, viz., 0·59 of an acre. The cost rate for topographical is also good. The work was very simple and amounted to practically only a boundary survey with few details.

The cost rate for Darbhanga of Rs. 189·2 per square mile for cadastral survey and records is high. The rate of Rs. 94 for cadastral survey, however, includes the bringing up to date of 186 square miles surveyed during the previous season but not khanapuried, and another reason of this high rate is the restricted programme, *i.e.*, only 413 square miles remained to complete the Darbhanga district. The high rate for record-writing, as compared with Monghyr work, is accounted for by the much smaller fields (only 0·35 of an acre) of Darbhanga. The outturn was also only 597 square miles as compared with the 785 of Monghyr and Patna. The cost-rate of Rs. 38·4 for traversing in Purnea is, I think, fair considering the unhealthiness of the tract surveyed. It should also be remembered that the cost of moving the camp and establishment to Purnea is included in this rate.

The rate of Rs. 39·8 for the Maksudpur traversing is good considering the very scattered nature of the work and the difficulties experienced and time lost in locating the villages of the estate.

The rate of Rs. 75·2 for traverse work in Backergunge is very high. This is accounted for by the fact that this is a newly started survey, and therefore, the cost of tents, office furniture, camp equipment and their transit charges as well as transit charges of establishment and instruments, are included in the expenditure. Also a large number of cylinders for marking stations had been ordered in advance from Raniganj. Arrangements have been made for the supply of cylinders locally, and none of the foregoing charges will be recurring in future seasons' work, but we cannot expect the cost rates to be as low as in Bihar, because no local labour is available and all *khalasis* have to be imported and then paid at nearly double the Bihar rates

of pay. The nature of the country makes the supply of boats to the surveyors necessary, and this is a heavy item of expenditure. The future cost-rate should be about Rs. 60 per square mile unless the programme is largely increased.

For the cadastral survey and record-writing in the Bamna Estate of the district, I have not computed the cost rates, as this was an experimental survey carried out by a very large establishment for the small area, and the resulting cost rates cannot be any guide for future work.

The cost rate of Rs. 55-9 for Singhbhum traverse work is high. This is due to the difficult nature of the country, excessive sickness amongst the establishment and to the small programme. This section has a full programme in Singhbhum and Ranchi next season and the rates will be lowered very considerably.

The cost rates ot Rs. 46·2 and Rs. 61·3 for traverse and topographical surveys in Champaran are, I think, fair considering the difficult nature of the country (which had to be closely contoured), the sickness amongst the establishment and the small programme.

General Principles.

4. The general principles of procedure have not been changed. The survey establishment carries out the traverse and cadastral surveys and also, under the direct instructions and supervision of the Settlement Department, the record-writing. During the recess season the entire field establishment of Inspectors and amins is retained, and each man completes the records and statistical statements of the villages surveyed by him.

The relations between the Survey and Settlement Departments have been most cordial.

Diara Surveys.

5. The experience of the past season has shown the impracticability of traversing the boundaries of villages in *diara* tracts according to the old revenue survey. There are three reasons why in *diara* tracts the revenue survey "mauza" is seldom correctly demarcated: *firstly*, because the changes in such tracts are naturally very great; *secondly*, because where the old boundary ran across sand and waste lands its exact position was of little or no interest to the inhabitants of the adjoining villages, and *thirdly*, because the *diara* survey of 1865 has, in the minds of the inhabitants, superseded the old revenue survey, and consequently the preliminary demarcation conforms generally to that of the *diara* survey. I have therefore decided in *diara* tracts to traverse in future according to the preliminary demarcation found on the ground and to serve out to the line-clearers and theodolite surveyors traces from the 1865 survey (instead of from the old revenue survey as heretofore) to enable them to proceed where they find the demarcation deficient. The usual comparison with the old revenue survey will be made afterwards in office and all differences shown where necessary.

Another difficulty in *diara* tracts which made itself severely felt during the season under report is the uncertainty as to the area to be dealt with and then how much of this area is to be surveyed cadastrally and how much topographically. This uncertainty upsets all programmes and estimates, and I propose to meet it by having traverses run along the high banks of the river immediately after the close of the rainy season. This will give us an idea as to the area to be dealt with some time beforehand and there is no reason why in future *diara* surveys these preliminary traverses, which would be on high ground not liable to riverain action, should not be run a whole season in advance. The second portion of the difficulty cannot unfortunately be met so completely, but as soon as we know the limits of the *diara* tract, by the method indicated above we can allot all Government and temporarily-settled estates contained within this tract, for cadastral survey and thus arrive at some approximation of the areas for cadastral and topographical surveys.

Village site Surveys.

6. During the year under report village sites in Bihar have been surveyed in detail on the 64″ scale, each hut being separately and accurately surveyed.

As the hut is, however, linked with its *sahin* or homestead land and is therefore only a *kitta* of the unit of survey, the Board have approved of a proposal to omit the survey of huts except under certain stated conditions. The cadastral survey rules for the coming season have been altered accordingly and particular attention is to be paid that no unnecessary surveying is done on the larger scale. Cheaper contract rates will be paid for village site surveys and a considerable saving in expenditure should be effected.

Training School for Traverse Surveyors.

7. The sudden large increase of the traverse survey programme from 1,379 square miles in 1899-1900 to 3,791 square miles during the past season put a very severe strain on our resources, and although all available experienced surveyors were given employment, it was necessary to employ a number of men who were put through a short course of instruction and then despatched on to field work. The result was a considerable amount of revision work which with a fully trained establishment would not have been necessary. The cadastral programmes were several times in danger during the season owing to delays in the traverse, and it was only by working in the field late into the recess season, that the programmes have been carried out. I proposed to the Board that as the programme for the coming season is even larger than that just accomplished, a training school for theodolite surveyors, chaining *tindals* and line-clearing *tindals* should be formed. This proposal has been approved by Government and the school was opened at Dumka in September under the direct control of Mr. C. S. Gasper, and there are about 40 sub-surveyors and the necessary number of *tindals* undergoing a course of instruction. These men will, at the close of the school, be drafted into the different field parties for the coming season's work. The cost of the school will be met by the field parties to whom the successful students have been appointed. The result, owing to increased efficiency and the expected savings on revision work, should be an almost immediate reduction of cost rates.

Attitude of the Inhabitants.

8. The attitude of the inhabitants to the traverse operation in all districts is described as having been extremely apathetic, except in Singhbhum, where considerable interest was shown and help readily afforded. The Sonthalis are reported to have shown rather more interest than they did last year, but this is not saying much. As regards the cadastral and record-writing operations, the attendance afforded in the Darbhanga district was satisfactory. In Monghyr the numerous petty landlords gave a lot of trouble by non-attendance and attempts to suppress their *raiyats*. The raiyats, however, displayed considerable interest and were very anxious to obtain their *parchas*. In Backergunge no active opposition was encountered which, I think, may be considered satisfactory.

Preliminary Demarcation.

9. The preliminary demarcation was, as in previous seasons, carried out by the inhabitants who were warned beforehand by means of notices distributed by the *chaukidars*. The demarcation in Singhbhum and Darbhanga was generally satisfactory. In the uplands of Monghyr, and in Backergunge indifferent, and in the Monghyr *diara*, Purnea and Gaya practically non-existent.

Powers of Officers under the Survey Act.

10. All survey officers in charge of traverse and cadastral operations were gazetted as Assistant Superintendents of Survey under the Survey Act [V (B.C.) of 1875] in the several districts in which they were employed. These powers were very little used except in Monghyr, where 2,676 process-fee notices, aggregating Rs. 2,007, had to be issued, and 161 fines, amounting to Rs. 2,865, had to be levied. All these notices and fines were against the petty landlords. The *raiyats* gave no trouble.

The sum total, for the whole of the survey operations in Bengal, was Rs. 2,850-12 for process notices and Rs. 3,600 for fines. The new form of

notice, intimating to the inhabitants the dates on which their attendance on the *amins* would be necessary, has been again used with success in Darbhanga, but it is hard to say whether it was of much use in Monghyr, probably it served its purpose with the *raiyats*, but the petty landlords entirely ignored it.

Health of Establishments.

11. One of the difficulties of the season has been the unusual amount of sickness amongst the survey establishments. In Darbhanga the health of the establishment has been uniformly good throughout the season, and the same remark applies to Monghyr notwithstanding the prevalence of plague in this district.

In Purnea, Singhbhum, Champaran, and the Sonthal Parganas the establishments suffered severely from fever. At times as many as 50 per cent. of the entire establishment were on the sick list. In Backergunge there was not much sickness to complain of, but two outbreaks of cholera amongst the imported *khalasis* caused some trouble.

Copies of Records.

12. During the season Rs. 3,965-14-4 were deposited by zamindars of the districts under survey, and others for copies of maps and records. Of this amount, Rs. 1,144-6-8 has been deposited in the treasuries as the Government fee or expended on Court-fee stamps and folios, and the balance paid to the copyists and examiners.

Badar Establishments in the field.

13. In order to ensure promptness in dealing with attestation *badars*, by far the greater portion of the *badar* work is now dealt with by small establishments with the field parties, and the cadastral sheets and area statements are kept with the field parties for this purpose until the close of the attestation stage. In all 6,550 *badars*, referring to the previous season's outturn in Darbhanga, have been thus dealt with during the season under report. There are no arrears of work.

Bengal Drawing Office.

14. In January last the control of the Bengal Drawing Office was transferred from the Assistant Surveyor-General to the Superintendent, Provincial Surveys. The steps taken for the reorganisation of this office and the working thereof are noted in the detailed report.

Entry of village names on map and records.

15. In accordance with the decision arrived at in April 1900, the names of villages are not inked upon the cadastral sheets until lists prepared by the Settlement Department at the attestation stage are received. Numerous mistakes in transliteration were at first found in these lists, and they have been attended to by the Settlement Officers concerned.

This work also affects the Bengal Drawing Office, where the maps and records of the past nine years' work will have to be brought into conformity with the new thana village lists. This work is being attended to by the "badar" section of the Bengal Drawing Office.

Recess Quarters.

16. The Behar traverse section and the Singhbhum traverse section recessed at Mussoorie. The Sonthal Parganas and Backergunge sections recessed at the head-quarters of their districts. The Darbhanga cadastral section recessed at Bhagalpur and the Monghyr cadastral section at Digha (Dinapore.) Both these cadastral sections were to have recessed at Bhagalpur, but it was thought advisable for sanitary reasons not to bring two large establishments into the same station. A proposal to locate one of the sections at Monghyr was opposed by the local authorities on account of the prevalence of plague, and finally Digha was decided upon.

Training of Junior Civilians.

17. The following members of the Indian Civil Service were put through a short course of instruction in traverse and cadastral surveys during February last, viz., Messrs. Rainy, Macpherson, Byrne, Peterson, Dunlop, Hazlett and Thomas.

Nepal Boundary.

18. Whenever the season's work has touched on the Nepal frontier, careful comparisons of our work with Colonel Tanner's survey of 1882-83 and with the old revenue survey maps have been made.

The surveys agree well, only one stone prism, No. 15, the site of which was cut away by the Kamla river, had been moved and replaced on more secure ground 373 feet to the west of its original position. An independent survey has been made of this portion of the boundary, and the matter has been referred to the Resident in Nepal, but no reply has as yet been received.

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND RECORDS OF RIGHTS IN TEMPORARILY-SETTLED AND GOVERNMENT ESTATES UNDER SETTLEMENT OF RENTS AND LAND REVENUE.

MAJOR SETTLEMENTS.

SONTHAL PARGANAS DISTRICT.

The traverse survey detachment in this district, under the charge of Mr. H. Dowman until the 10th June 1901 and afterwards under Mr. C. S. Gasper, was employed solely on the completion of the survey of the Government estate of the Damin-i-koh.

Field work commenced on the 18th October 1900 and closed on the 2nd June 1901.

The area accomplished which completes the Damin-i-koh estate consists of 735 square miles, comprising 979 villages and 22 jungle blocks.

The above-mentioned 22 jungle blocks cover an area of 166 square miles, and comprise in addition to forest lands a number of paharia unsettled villages which are not for survey. The area traversed also includes three villages, covering 2 square miles, which fall within the jungle blocks of the previous season's outturn. These villages have now, at request of the Settlement Officer, been traversed in detail.

The preliminary demarcation of village boundaries, which was carried out by the *parganites* under instruction from the Deputy Commissioner, was found satisfactory.

There were 17,723 new traverse stations in the season's work, and for the making of these 1,969 trijunction stones, 6,582 clay cylinders and 9,172 pegs were utilised.

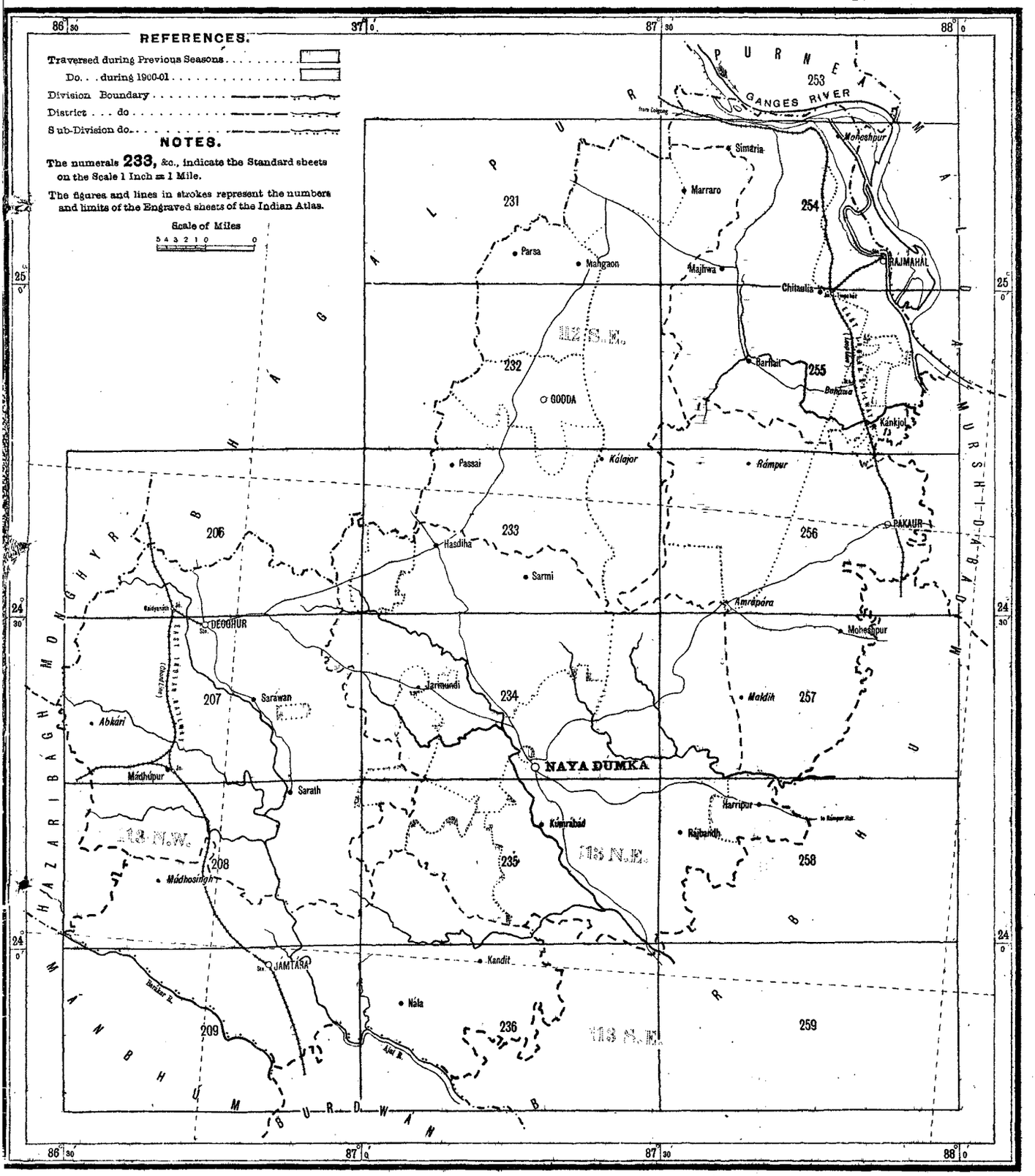
The country traversed was hilly and difficult to work in. The subtense bar method of ascertaining the direct horizontal distances between two traverse stations had to be freely resorted to, as chaining over such rough ground gave very indifferent results. The method which consists of measuring with the theodolite the angle subtended at the station of observation by a horizontal 10-foot bar plumbed over the station mark of the forward station is an accurate but tedious method of arriving at the true distance; for, in order to ensure accuracy, the angle has to be repeated from 20 to 50 times. The progress of the work was much delayed owing to this cause, but the late date of completing the programme was also due to wholesale desertions amongst the establishment. Most of these desertions were undoubtedly due to the unhealthiness of the tract under survey. Practically the whole of the establishment were under treatment for fever in the camp hospital for various periods from four to five times during the season and there were nine deaths.

The Sonthalis are reported to have shown a little more interest in the survey proceedings, but the *Paharias*, through ignorance, gave trouble whenever the work touched on their boundaries. However, on the whole procedure being explained to them they permitted the surveyors to go on with their work.

BENGAL SURVEY.

INDEX TO THE TRAVERSE SURVEY IN DIST. SONTHAL PARGANAS.

1900-01. DETACHMENT.



Reg. No. 351, S. I. D.—Oct 01.—700.

Photo. S. I. O., Calcutta.

No 602-S. 01.

The plots of the whole season's work have been completed and made over to the Settlement Department. The records have been completed in every respect except that the co-ordinates of the main and sub-circuits have, by my orders, been left in pencil pending an attempt which will be made early next season to connect our traverse work with some stations of the Great Thigonometrical Survey which are situated across the Ganges river. If this attempt at a connection proves successful, we can apply any necessary corrections and close our work finally. If we cannot connect then the work must be *inked* up and stand on its own merits, as there are no nearor Great Trigonometrical stations available. The usual mathematical tables showing the values of the a angular work and the chaining have been compiled and submitted to the Surveyor-General's office. All the work has proved to be well within the percentage of error allowed.

The mean magnetic variation derived from the result of the 140 azimuths observed is 1° 46′ east of the true meridian.

The whole establishment, with the exception of the temporary khalasis who absconded, has worked very well.

The expenditure and cost rates are given in the general remarks at commencement of the report.

PART II.—REPORTS ON SURVEYS AND RECORDS OF RIGHTS IN PRIVATE ESTATES.

MAJOR SETTLEMENTS.

MONGHYR DISTRICT.

Traverse Survey.

The traverse operations in this district were in continuation of those of the previous season and comprised the traversing of the Ganges *diara* in thanas Tegra and Begusarai for immediate detail survey and the traverse in advance of an upland area in thana Gogri for next season's detail survey.

This programme was undertaken as a part of the work of the North Bihar traverse section under Captain Mears. Field work was commenced on 1st November and the whole establishment was put into the *diara* tract in order to supply the plots for the detail survey at an early date. As this work approached completion the establishment was gradually transferred to the upland tract and thence to Purnea.

The outturn accomplished comprises 453 villages and 747 square miles. Of this, 198 villages and 246 square miles represent the *diara* tract of thanas Tegra and Begusarai, and the balance is the upland area traversed in advance in thana Gogri. The area in thana Gogri excludes 78 square miles of Srinagar-Baneli Raj village which were surveyed in 1887-88, and therefore excluded from the current operations by Government Notification No. 1520L.R., dated 13th March 1901.

In the *diara* tract owing to difficulties in ascertaining the true position of the southern high bank of the Ganges the river circuit was run unnecessarily far in a southerly direction. The tract, afterwards found to have been thus unnecessarily traversed, covers 20 square miles which is included in the total figures of outturn, but the villages contained therein have not been taken credit for. Also an area of 23 square miles of thana Gogri, which the existing map showed as in thana Begusarai was traversed but not immediately surveyed in detail. As this tract is in the *diara* it is very probable that some revisionary work will be necessary therein before the detail survey camp can deal with it next season. The preliminary demarcation of village boundaries carried out by the inhabitants themselves was found to be in the upland tracts very satisfactory on the whole, and to agree well with the old revenue survey. In the *diara* tracts, however, the demarcation was not at all satisfactory. I have referred to this in detail in the general remarks at commencement of this report.

There were 11,790 new stations in the season's outturn of work. Of these, 726 were marked by trijunction stones, 7,892 by cylinder, and the balance of

3,172 by pegs. The pegs were used in the *diara* and on disputed boundaries pending settlement of the disputes. A line of permanent marks has been laid along the southern high bank of the Ganges. This has been effected by embedding trijunction stones at theodolite stations at average intervals of half a mile apart. This line of permanent marks should prove very useful for relaying boundaries hereafter in the *diara* tract.

To check the accuracy of the angular work, 85 observations for azimuth were taken.

The magnetic variation calculated from the results of all the foregoing azimuth observations is 2° 03′ east of the true meridian.

The angular work has proved well and the chaining, on its own merits, is well within the percentage of error allowed, but the results of comparison of the direct distances between three great trigonometrical stations, as given by the great trigonometrical survey and as computed from our traverses, works out to about 15 feet per linear mile which is rather higher than we generally expect. This error does not, however, in any way affect the 16″ plots, nor therefore the subsequent detail survey. Nor is the error surprising, considering the inefficiency of a considerable portion of the chaining establishment at the commencement of the season. The programme was much larger than that of the previous season and experienced men were not available. The usual tables of mathematical results showing the value of the angular and chaining work have been compiled and submitted to the Surveyor-General's office.

The progress of the traverse work in Monghyr was slow, and the detail survey camp experienced some inconvenience from the consequent late delivery of plots. The causes of this delay were: firstly, difficulties experienced owing to defective demarcation in the *diara* tract; and secondly, inefficient establishment. I have dealt with both these causes in detail elsewhere in this report under the head of general remarks.

The whole of the computations have been completed and the plots supplied to the cadastral camp concerned. The cost and cost rates will be found in paragraph 3 of this report.

Cadastral Survey.

The cadastral survey with record-writing of thanas Tegra, Begusarai, with the exception of the villages of the Narhan Raj Estate and the Srinagar-Baneli Raj estate which had been previously surveyed in seasons 1895-96 and 1887-88 respectively, was ordered in Government Notification No. 1521L.R., dated 19th March 1901.

The cadastral section under Mr. A. W. Smart commenced field work on the 1st of November 1900 and returned to recess quarters on the 10th May 1901.

The outturn accomplished is given in the following tabular statement:—

Thana.	Cadastral Survey.			Record-writing.		
	Villages.	Fields.	Square miles.	Villages.	Fields.	Square miles.
1	2	3	4	5	6	7
Tegra	517	281,851	204	517	281,851	204
Begusarai	655	501,126	478	655	501,126	478
Monghyr	5	7,225	34	5	7,225	34
Lakhisarai	2	2,841	9	2	2,841	9
Surajgarh	1	239	4	1	239	4
Gogri	4	5,916	12	...	...	...
Total ...	1,184	799,198	741	1,180	793,282	729

The amount of work in above table against thanas Monghyr, Lakhisarai, Surajgarh, and Gogri refers to the *diara* of the Ganges river and was undertaken in order to comply with the instructions of Government to survey up to the southern high bank of the river. The four villages of thana Gogri

surveyed but not *khanapuried* were omitted from *khanapuri* at the request of the Settlement Officer. These four villages form a part of the area referred to in the report on Monghyr traverse as having been traversed under the impression that it belonged to thana Begusarai. The cadastral survey is mapped on 1,722 sheets on the 16″=1 mile scale, and for village site surveys on the 64″ = 1 mile scale, for which there was insufficient room on the margins of the 16″ sheets, 570 extra sheets have been utilized.

The detail survey was checked by 2,131 linear miles of *partals* run by the Survey officers, and independently, and by 2,134 linear miles of *partals* by Inspectors. This gives a total of 4,265 linear miles and an average of 5·75 linear miles of test survey to each square mile of detail survey. In addition the village sites were tested by re-surveys of 435 portions and by 3,581 *partal* lines run through the main streets and alleys.

The demarcation throughout the area surveyed was found to be very imperfect, and in many cases the village boundaries appear to have been unknown to the landlords.

There were 416 boundary disputes in the area under survey, all of which have been decided by the Settlement Department. Disputes relating to entries in the record of rights amounted to 31,137. Of these, 30,604 have been settled and 533 remain over for disposal at the attestation stage.

In cases where there was reason to believe that the *raiyat* was being suppressed by his landlord, lists of the plots concerned, with traces, were submitted to the Settlement Department for orders. There were altogether 24,577 plots so affected, and of these, orders have been passed on 20,746 plots, and the remaining 3,831 plots will be dealt with during attestation. The Collectorate registers received from the Settlement Officer were prepared *mahalwar*, and the draft *khewats* had therefore to be compiled in the Survey office *mauzawar*. The existing Collectorate registers were found to be unreliable. Out of 1,180 villages, it was found only possible to identify the draft *khewats* of 814. The usual comparison with existing possession has been made, and all differences have been shown in red ink. There are 197 villages containing revenue-free lands, and for these lands no draft *khewats* were received. The Settlement Officer ordered that duplicate *khewats* according to claims should be prepared, and one copy be sent to the Collector for verification.

The record-writing, owing to the large number of petty landlords, who had to be dealt with, has been very intricate. In the 1,180 villages of the season's outturn, there were 68,237 landlords, 6,011 *tauzis* and 9,831 *pattis*. The smallest value of a proprietary share works out to one-twenty thousand four hundred and eighty millionth part of a rupee.

In a plot of land, area 0·57 of an acre, there are 1,582 shares. Thus each share represents $0{\cdot}00036\frac{24}{711}$ of one acre. Another curious feature in the season's work occurs in the Government estate of Ramdiri, where the fields containing many co-sharers vary from 25 links to 5 chains in width and are $1\frac{3}{4}$ miles in length.

The attitude of the petty landlords to the survey operations was very hostile, their attendance was very bad, and they gave a lot of trouble by attempting to suppress their *raiyats*. The *raiyats*, on the other hand, showed considerable interest and were very anxious to get their *parchas*.

Notwithstanding the use of the form of notice for attendance which has given such good results during previous seasons, a considerable number of fines and process-fee notices had to be levied. All these were against the landlords. Particulars are given in paragraph 10 of this report.

In seven out of the 60 Narhan Raj estate villages, lying within the tract surveyed, but excluded from the current operations, it was found that only the Raj share had been surveyed. It was therefore necessary to complete the remaining portions of these villages. This has been done, and a fresh record prepared for the Raj portions. In three of these villages the corrections necessary, owing chiefly to partitions, were so wholesale as to make the maps almost illegible.

The health of the establishment, notwithstanding the prevalence of plague throughout the entire area, was particularly good. One man only died of plague, two of cholera.

The entire work of the season has been completed in every respect (with the exception of the inking up of village names on the maps, which will be done on receipt of lists from the Settlement Department), and the traces and records, &c., have been forwarded to the Settlement Department.

The cost and cost-rates are dealt with in paragraph 3 of this report.

Topographical Survey.

All villages lying in the Ganges *diara* and excluded from settlement under the Bengal Tenancy Act, have been surveyed topographically on the 16″ = 1 mile scale.

The outturn accomplished comprises 13 villages, 26 square miles, distributed as follows:—Thana Begusarai 6 villages, 9 square miles, thana Monghyr 3 villages, 4 square miles, and thana Lakhisarai 4 villages, 13 square miles.

The mapping is contained on 39 sheets and the village sites were surveyed in blocks in position on the 16″ plans. The survey was checked by 106 linear miles of test survey, which gives an incidence of 4·18 linear miles to each square mile of detail survey.

There was 10 boundary disputes with the adjoining cadastrally surveyed villages and three disputes between the topographically surveyed villages, all of which have been settled.

This survey was carried out by the Monghyr cadastral section, and all the remarks as to demarcation, attendance, &c., apply equally to the topographical area.

The expenditure and cost-rate are given in paragraph 3 of this report.

PATNA DISTRICT.

Traverse Survey.

By Government Notification No. 176T.R., dated 16th May 1901, a survey of all lands lying between the southern boundary of the district of Monghyr to the north of the Ganges river and that part of the southern high bank of the river in the Patna district was ordered.

The traverse survey was undertaken in connection with that of Monghyr by the Bihar traverse section, and comprised 22 villages in thanas Barh and Mokameh, covering an area of 60 square miles.

There were 352 new stations in the area under survey, and these have been marked by 48 stones, 10 cylinders and 294 pegs. The stones were used entirely on the continuation of the line of permanent marks referred to in the report on Monghyr traversing.

The remarks, as to demarcation, in the report on Monghyr traverse work apply equally here, as the Patna *diara* traverse was taken up as a part of the Monghyr work and the figures as to area and cost separated afterwards.

The computations have all been completed.

The cost and cost rates are noted in paragraph 3 of this report.

Cadastral Survey.

The cadastral survey with records, which was carried out by the Monghyr cadastral section in connection with the *diara* surveys in Monghyr and Patna comprises 18 villages and 8,476 fields, covering an area of 56 square miles.

The mapping on 16″=1 mile scale has been done on 71 sheets.

The survey has been checked by 190 linear miles of *partals*, which gives an average of 3·39 linear miles of test survey to each square mile of detail survey.

In the records the entries against 3,249 plots have been checked, which gives an average of 38·3 per cent. on the total number of plots.

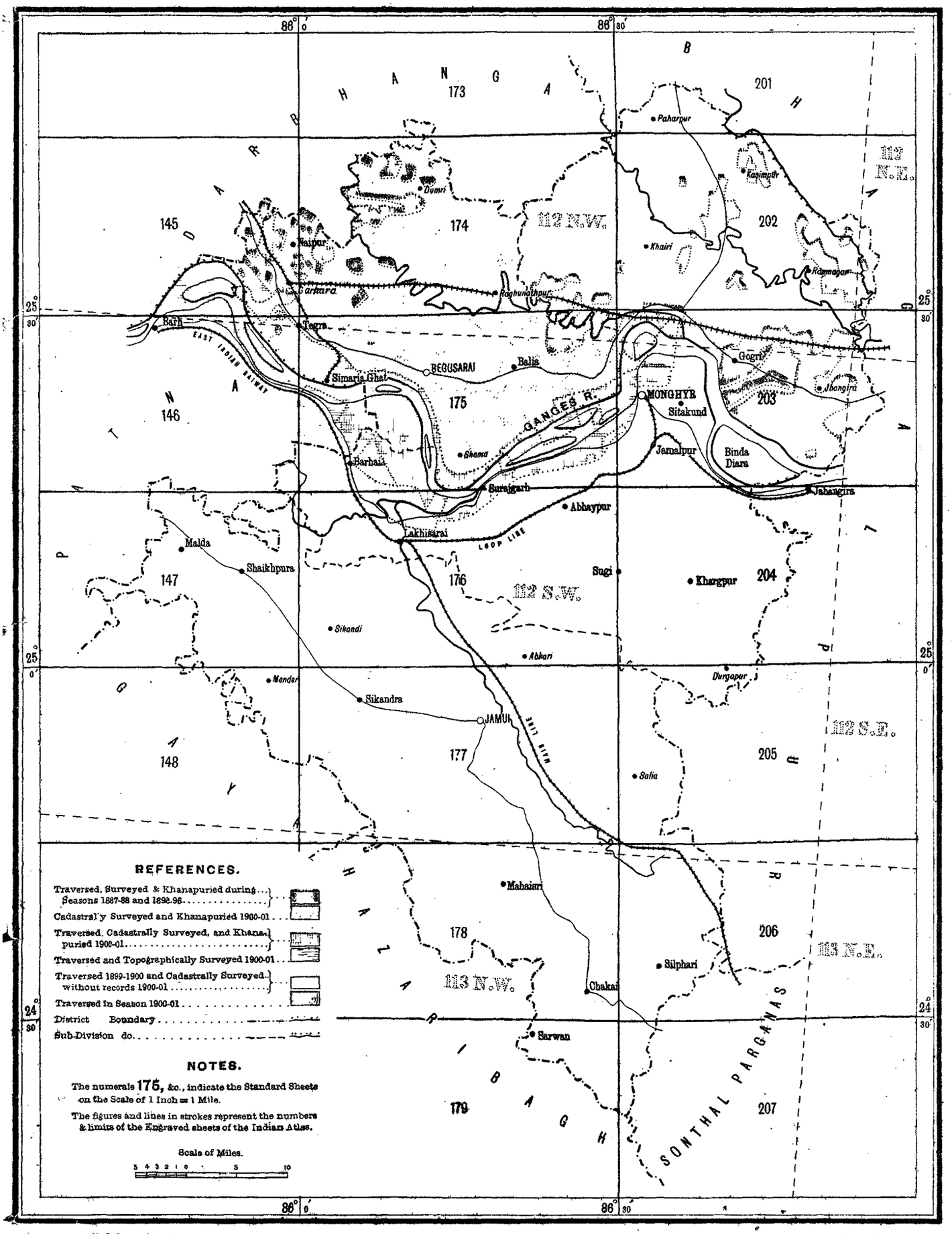
The village boundaries in the whole of this area were practically all disputed. There were 14 boundary disputes with villages of districts Monghyr and Darbhanga, and nine disputes within the area.

The demarcation here, as elsewhere in the *diara* tract, was very defective and inaccurate.

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTS. MONGHYR & PATNA.

1900-01. No. 4 PARTY.



REFERENCES.

Traversed, Surveyed & Khanapuried during Seasons 1887-88 and 1892-96

Cadastrally Surveyed and Khanapuried 1900-01

Traversed, Cadastrally Surveyed, and Khanapuried 1900-01

Traversed and Topographically Surveyed 1900-01

Traversed 1899-1900 and Cadastrally Surveyed without records 1900-01

Traversed in Season 1900-01

District Boundary

Sub-Division do.

NOTES.

The numerals 175, &c., indicate the Standard Sheets on the Scale of 1 Inch = 1 Mile.

The figures and lines in strokes represent the numbers & limits of the Engraved sheets of the Indian Atlas.

Scale of Miles.

5 4 3 2 1 0 5 10

Reg. No. 351, S. I. D.—Oct 01.—700.

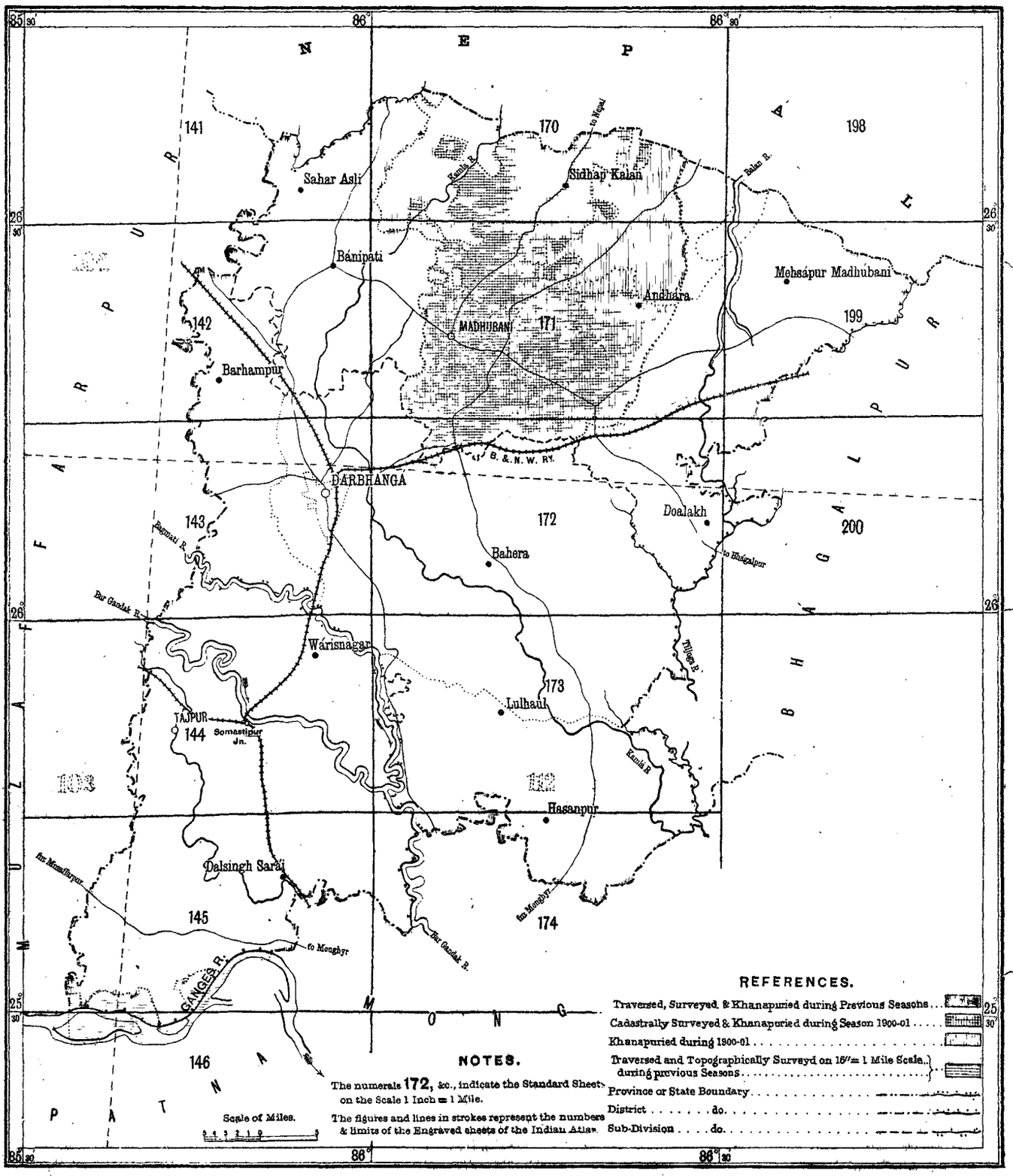
Photo. S. I. O., Calcutta.

No. 600-S 01.

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DIST. DARBHANGA.

1900-01. No. 4 PARTY.



NOTES.

The numerals **172**, &c., indicate the Standard Sheets on the Scale 1 Inch = 1 Mile.

The figures and lines in strokes represent the numbers & limits of the Engraved sheets of the Indian Atlas.

Scale of Miles. 0 1 2 3 4 5

REFERENCES.

- Traversed, Surveyed & Khanapuried during Previous Seasons
- Cadastrally Surveyed & Khanapuried during Season 1900-01
- Khanapuried during 1900-01
- Traversed and Topographically Surveyd on 16″= 1 Mile Scale during previous Seasons
- Province or State Boundary
- District ..... do.
- Sub-Division .... do.

Reg. No. 351, S. I. D.—Oct. 01.—700.

Photo. S. I. O., Calcutta.

No. 599-S. 01.

Of the 18 villages surveyed, nine are entirely Government estates, and in these villages in particular the attendance during the survey and record-writing stages was particularly bad. This was frequently brought to the notice of the authorities concerned, but it was not until the last week of April, when the work was practically completed, that a kanungo was appointed. The reason offered for the bad attendance was that the patwaris and headmen of the villages were required for the collection of rents.

The work has been completed in every respect and the records handed over to the Settlement Department.

The cost and cost rates are given in paragraph 3 of this report.

Topographical Survey.

The area in the Patna *diara* excluded from settlement under the Bengal Tenancy Act comparised four villages and covered 11 square miles. This tract, which is all in thana Mokameh, has been topographically surveyed on the 16″ scale.

The survey covers 10 sheets, and the village sites are surveyed in blocks in position on the field plans.

The area surveyed is nearly all sand and water. The survey has been checked by 12 linear miles of *partal* survey, which gives an average of 1·1 linear miles test survey to each square mile of topography.

There were only three boundary disputes.

The cost and cost rates are given in paragraph 3 of this report.

DARBHANGA DISTRICT.

Traverse Survey.

The traversing proper of this district was completed in 1898-99, but as the traverse survey of the area under cadastral survey during the year under report was completed so long ago as 1895-96, it was anticipated that a large number of the traverse stations would not be forthcoming, and the amount of work thus entailed was roughly estimated to be equivalent to 100 square miles of traversing. Fortunately this revision work did not prove quite so heavy as had been anticipated, the revision work being confined to an area of 64 square miles in thana Madhubani. The theodolite was set up at 1,289 stations, and the linear miles of new chaining amounted to 177.

The cost of the work is given in Appendix II of the report. It was unfortunate that owing to the change of programme (*vide* paragraph 2 of the Annual Report of 1896-97) in 1896-97 on account of the famine in the north of this district that the cadastral survey of the area traversed in 1895-96 could not be undertaken until 1900-1901.

Cadastral Survey.

The Darbhanga cadastral section under Mr. C. S. Kraal commenced field work in the first week of November, and, on completion of its programme, returned to recess quarters on the 20th April 1901. The outturn of the season is shown in the following tabular statement :—

THANA.	CADASTRAL SURVEY.			RECORD-WRITING.		
	Villages.	Fields.	Square miles.	Villages.	Fields.	Square miles.
1	2	3	4	5	6	7
Madhubani ...	297	534,506	279	297	534,506	279
Khajauli ...	67	234,068	134	196	551,768	319
Total ...	364	769,574	413	493	1,086,274	598

The excess of record-writing over cadastral survey in thana Khajauli refers to the area surveyed during the previous season, but of which the record-writing was postponed.

The survey is contained in 629 sheets on the 16″ scale, and there are 550 additional sheets for the 64″ scale village site surveys.

The average size of the field was only 0·35 of an acre. The independent *partals* amounted to 932 linear miles, and the Inspector's *partals* to 1,091 linear miles. The total gives an incidence of 4·9 linear miles of test survey to each spuare mile of detail. In addition to the foregoing, 695 blocks in the village site were resurveyed and 1,461 *partal* lines run through the streets and lanes. In the record-writing the entries against 18,377 fields were checked by the European Survey officers and 371,938 by the Inspectors. The total of 390,315 gives an average of 36 per cent. of the total number of plots.

There were altogether 207 boundary disputes, all of which have been decided by the Settlement Department.

There were 33,093 disputes regarding entries in the record. The settlement kanungoes have decided all but 102, which remain over for the attestation stage.

The preliminary demarcation carried out by the inhabitants themselves was found to be generally satisfactory. The attendance afforded at the survey and record-writing stages by the villagers was also satisfactory. The form of notice for attendance was used with good results, and only a few fines had to be inflicted and a few process-fee notices issued.

Copies of the Collectorate registers were received in good time, and all unrecorded mutations have been shown in red ink in the draft *khewats* compiled thereform.

There were not nearly so many *pattidari* tenures in the season's work in this district as in Monghyr, and consequently the record-writing has not been nearly so intricate in its nature, although the small size of the fields made this work very heavy.

In this district the same procedure, as followed in Monghyr as regards the submission for orders to the Settlement Department of all cases where there was any doubt as to *bakast* claims, was also adopted.

The health of the establishment has been very good throughout the season. Only two deaths from fever occurred.

The records of the entire season's work have been completed, with the exception of 43 villages, the records of which will be ready early in October.

Purnea District.

Traverse Survey.

The survey of the Surjapur pargana of district Purnea was ordered in Government Notification No. 2170T.R., dated 22nd October 1900.

The North Bihar traverse section, as its work in Monghyr and Patna approached completion, moved its establishment into Purnea, and the work in this district may be said to have fairly started on the 1st January 1901.

The outturn of work accomplished comprises 854 villages covering an area of 728 square miles. One village of the Srinagar-Baneli Raj was found to lie within the Surjapur pargana, and as this had been previously surveyed, it was excluded from the current operations.

The origin of survey selected was the intersection of N. Lat. 25°50′ and E. Long. 87° 40′.

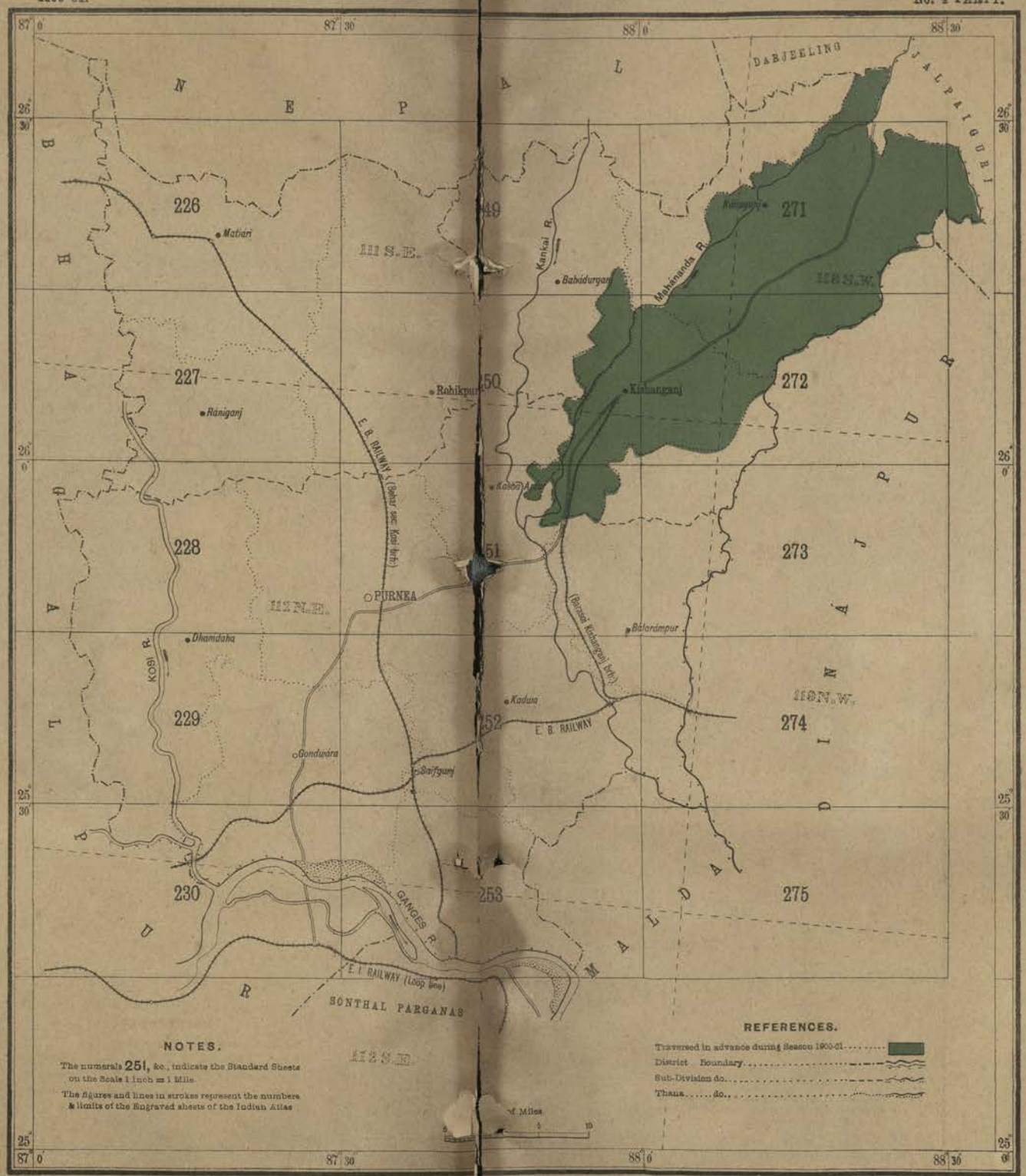
To check the accuracy of the angular work, 109 observations for azimuth were taken. The mean magnetic variation calculated from the results of the azimuths was 2° 04′ east of the true meridian. There were 12,584 new theodolite stations in the season's work, and these were marked by 1,743 stones, 10,716 cylinders and 125 pegs.

The preliminary demarcation of village boundaries supposed to be done by the inhabitants themselves was found at the commencement of the operations to be practically non-existent. Captain Mears reports that the District officers informed him that as the *gutch* was the local village, it was useless to expect the inhabitants to demarcate according to the old revenue

BENGAL SURVEY.

INDEX TO THE TRAVERSE SURVEY IN DISTRICT PURNEA.

1900-01. No. 4 PARTY.



NOTES.

The numerals 251, &c., indicate the Standard Sheets on the Scale 1 inch = 1 Mile.

The figures and lines in strokes represent the numbers & limits of the Engraved sheets of the Indian Atlas

REFERENCES.

Traversed in advance during Season 1900-01.....

District Boundary.....

Sub-Division do.....

Thana.....do.....

Reg. No. 302, S. I. D.—Aug. 01—700.

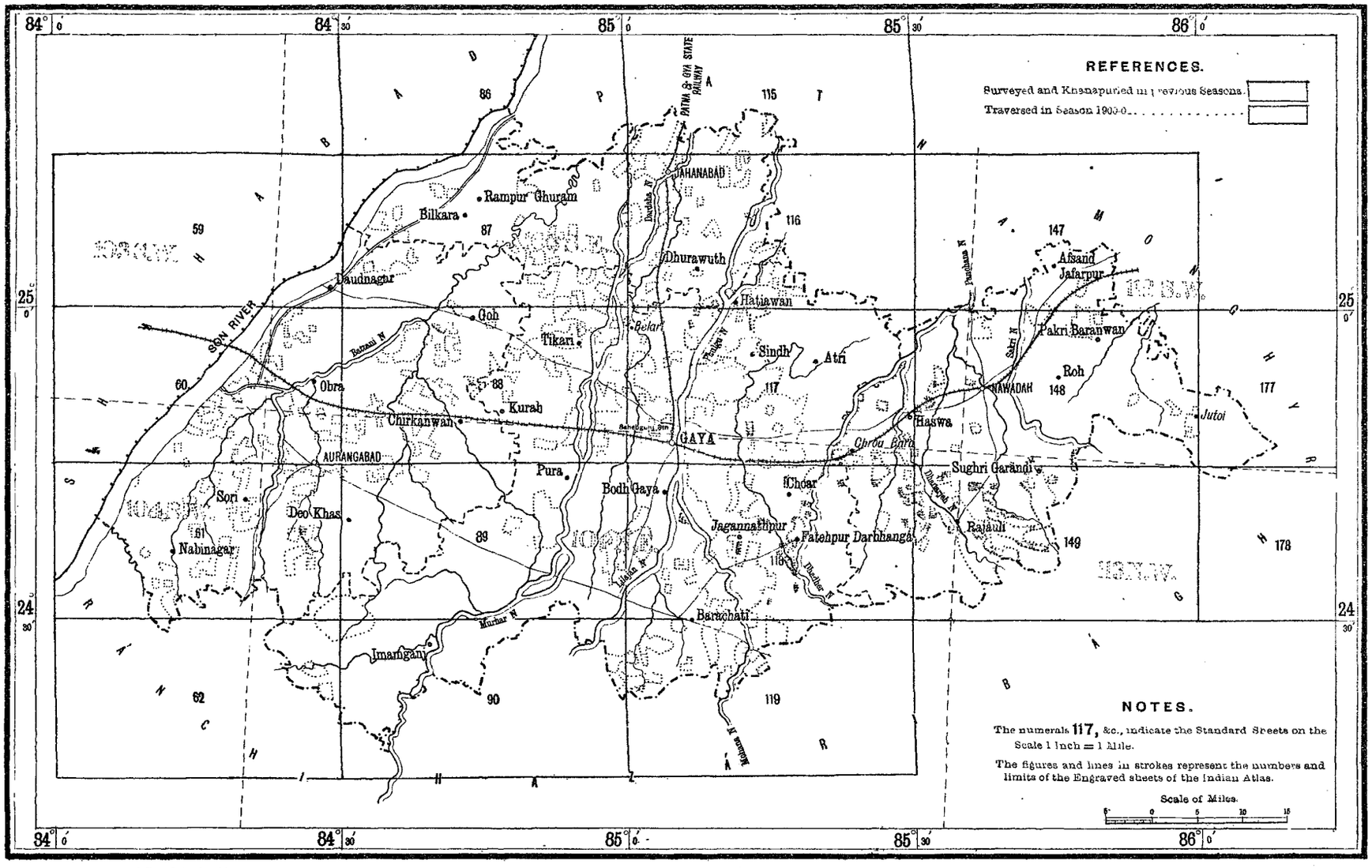
Photo. S. I. O., Calcutta.

No. 528-S. 01.

BENGAL SURVEY.

INDEX TO THE CADASTRAL & TRAVERSE SURVEYS IN DISTRICT GAYA.

1900-01. No. 4 PARTY.



Reg. No. 351, S. I. D.—Oct 01.—700. Photo. S. I. O., Calcutta.

No. 592-S. 01

survey. This Captain Mears found to be a fallacy, for as soon as the inhabitants were really forced to attend, they at once pointed ou rtheir boundaries according to the revenue survey, and a comparison of the pesent traverse survey with the old maps of the revenue survey proved most satisfactory. This conclusively proves that the want of demarcation was not due to ignorance but to laziness.

Owing to the delays at the commencement of the operations in this district from the foregoing cause, Mr. Causley was transferred from one of the cadastral camps to aid in field inspections.

The Kissenganj subdivision, in which pargana Surjapur is situated, is notoriously unhealthy, except perhaps for the months of January, February and March. During April and May the establishment suffered severely from fever. About half the entire establishment were on the sick list during these months, and even of those still on duty a great portion suffered considerably and were unable to give a full outturn of work. The computing establishment, even after the move to the recess quarters at Mussoorie, suffered from fever for several months.

All the computations have been completed and the plots made over to the cadastral camp for detail survey next season. The usual computations showing the mathematical value of the angular work and chaining have been forwarded to the Surveyor-General's office. The work has proved remarkably well. The chaining in this district has also proved very well, the error per mile being only about 6 feet. This is no doubt due to the experience gained by the newly trained men while employed in Monghyr and Patna.

Captain Mears reports that he is much indebted to Mr. Rolt, the Manager of the Khagra estate, for ready assistance during the traverse operations, and particularly for lending the services of the estate peons to accompany the surveyors, thereby ensuring the attendance of the inhabitants to point out their boundries.

The cost and cost rates are noted in paragraph 3 of this report.

Gaya District.

Traverse Survey.

The survey of the Maksudpur estate was ordered in Government Notifications Nos. 3225L.R. and 3226L.R., dated 18th September 1900, and again in Notification No. 4150L.R., dated 24th December 1900. The villages of this estate are scattered all over the district, and there was very great trouble in locating the same, owing to the very indifferent demarcation and defective lists provided. The first lists received gave 171 villages with a total area of 150 square miles as the programme, but this list was frequently amended as the work proceeded and the Survey and Settlement Departments were in a position to make local enquiries.

The actual outturn accomplished as part of the programme of the Bihar traverse section under Captain Mears was 156 villages with a total are of 128 square miles, and this, with the exception of one village just lately reported as unsurveyed, is believed to represent the extent of the entire estate. The remaining village will be seen to next season.

The surveyors were directed to make careful enquiries on the ground before traversing a village, but notwithstanding this, about 12 villages were traversed which proved afterwards not to be the property of the estate. The lists were most confusing, and gave the names of several villages, which local enquiry proved to have been already traversed in 1897, as part of the Tikari ward's estates. Several villages not mentioned in the lists were ascertained by the surveyors and Settlement Department to belong to the Maksudpur estate, and were accordingly noted in the revised lists.

This confusion appears to exist in the records of all estates of which the villages are scattered. We have had exactly the same difficulties in the Tikari and Narhan estates in Gaya and Monghyr and other estates elsewhere.

As no use could be made of such scattered work for the purposes of compilation of new district maps, no attempt has been made to connect the traverse polygons by connecting traverse lines, and each village or block of villages has been plotted on its own magnetic bearing.

There were altogether 3,503 theodolite stations, and these have been marked by 966 stones, 2,342 clay cylinders and 195 pegs.

The plots on the 16″ scale and the rough plots on the 4″ scale were forwarded in batches to the Settlement Department for immediate cadastral survey as soon as the villages were proved and plotted.

The whole of the traverse records have been completed. All the work has proved well except in a few villages, in which the error passed is slightly above the usual percentage. These errors, which will not affect the accuracy of the plots, were due to the hilly nature of the country traversed.

The cost and cost rates are noted in paragraph 3 of this report.

Backergunge District.

Traverse Survey.

The traverse survey of thanas Bauphal, Nalchiti, Barisal and Backergunge was ordered in Government Notification No. 1959L.R., dated 2nd October 1900, and subsequently the traverse and cadastral survey of the Bamna estate in thana Math Baria was sanctioned by Notification No. 448L.R., dated 19th January 1901.

Mr. E. F. Berkeley was appointed to the charge of the new detachment which had to be formed for this survey. Field work commenced on the 2nd November 1900, and closed on the 15th June 1901. The following tabular statement shows the outturn accomplished :—

Thana.	Number of villages.	Area in square miles.
Barisal	241	176
Nalchiti	197	90
Backergunge	169	146
Bauphal	132	160
Math Baria	47	36
Total ...	786	608

The origin of survey adopted was the intersection of N. Lat. 22° 30′ 00″ by E Long. 90° 30′ 00″. It was decided to employ an entirely local or Bengali establishment for this survey, and all the surveyers and computers selected were Bengalis, but as no *khalasis* could be obtained locally, it was found necessary to import 250 from Hazaribagh.

The preliminary demarcation which had been done during the previous season had to be practically redone immediately before the traverse survey proper commenced.

There were 19,431 theodolite stations in the area traversed. Of these, 16 were old pillars and the remainder were marked by 1,250 stones, 17,256 cylinders and 909 pegs.

To check the angular work, 82 azimuth observations were taken, and the mean magnetic variation calculated from the results of these azimuths is 1° 36″ east of the true meridian.

The plots and computations have all been completed, and the usual table of mathematical results compiled and submitted to the Surveyor-General's office. The work has all proved well.

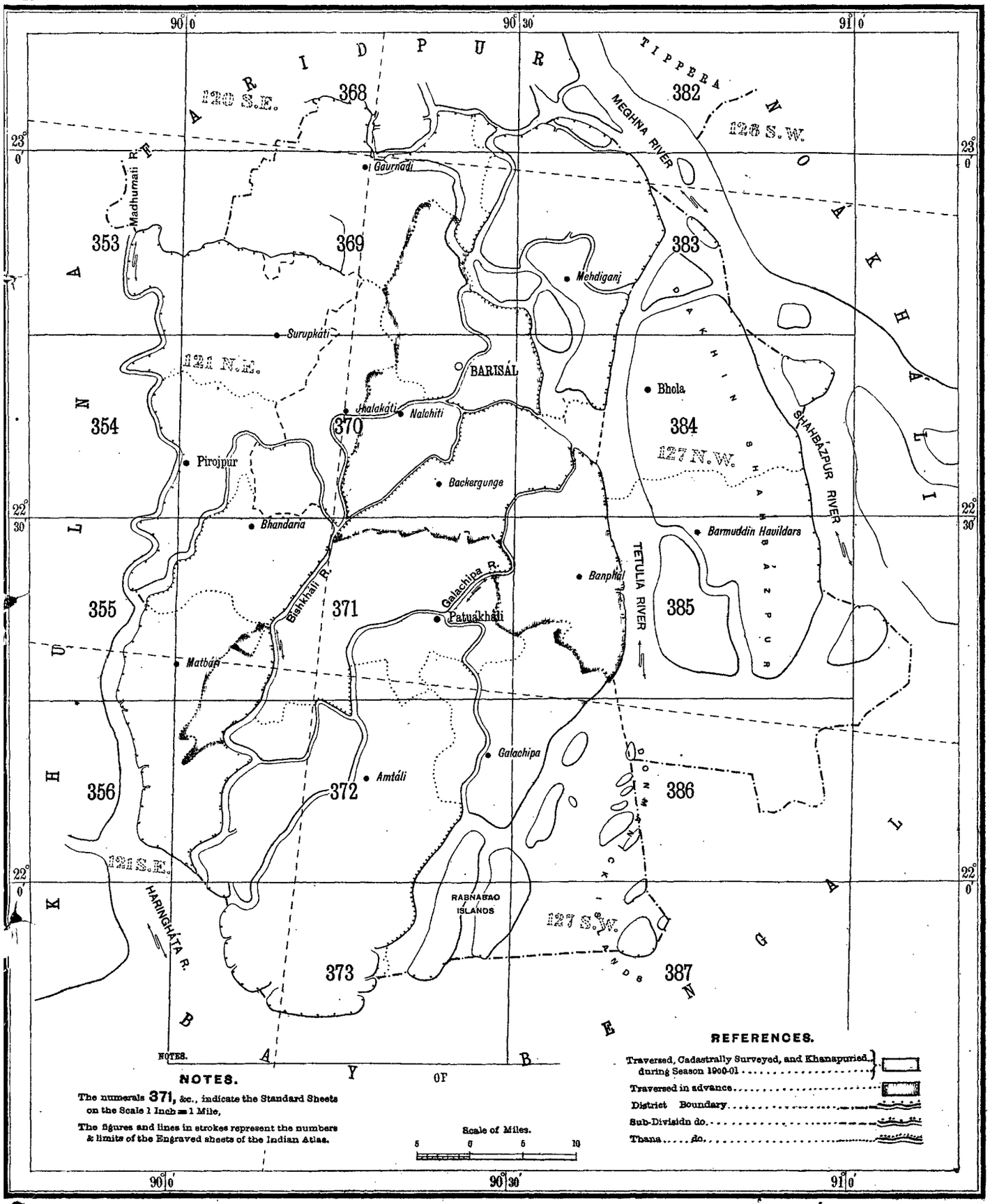
The difficulties in this survey have been considerable and necessitated working in the field well into the usual recess season. The country traversed presents many natural difficulties, for, although absolutely flat, it is intersected by tidal rivers and narrow winding creeks, which make communications difficult. In the early part of the season before the rain-water subsided, and also during the latter portion owing to the high flood tides, the daily outturn of work was small. The health of the establishment was, on the whole, fairly good, except for an epidemic of cholera amongst the newly imported *khalasis* on their arrival and again during March and April. These epidemics were the cause of a considerable number of desertions from an establishment very difficult to replace.

The attitude of the inhabitants towards the survey operations was generally extremely apathetic. At the commencement some opposition was offered to the line-clearing establishment, but as the precaution had been taken to employ only

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT BACKERGUNGE.

1900-01. BACKERGUNGE DETACHMENT.



Reg. No. 302, S. I. D.—Aug 01—700.

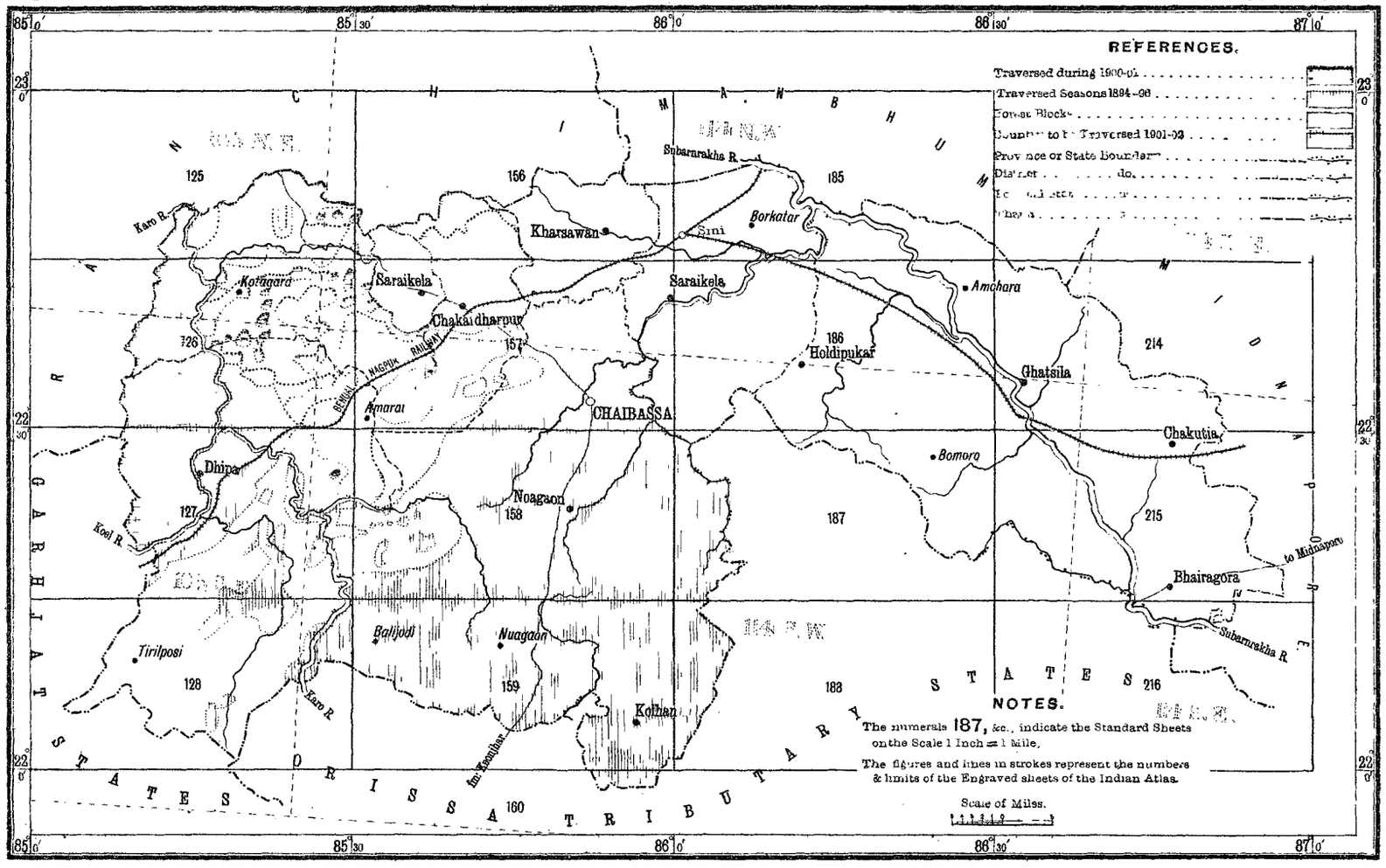
Photo. S. I. O., Calcutta.

No. 527-S 01.

BENGAL SURVEY.

INDEX TO THE TRAVERSE SURVEY IN DISTRICT SINGHBHUM.

1900-01. DETACHMENT



local *amins* as line-clearers, and not the ordinary imported *khalasi*, these *amins* were able to explain the objects of their work and were allowed to proceed. A considerable number of survey marks were uprooted and replaced roughly. These cases were generally owing to inquisitiveness, but in other cases where the mark was not replaced, there is no doubt the removals were due to private funds and were effected in the hopes of getting the owner of the field concerned into trouble. Also some of the marks were probably found useful for domestic purposes and for fishing operations. Enquiries were made into every case where a mark was reported missing, but in all newly started survey operations there is always more or less trouble of this sort, and due consideration has to be made for igno ance.

The cost and cost-rates are noted in paragraph 3 of the report.

Cadastral Survey.

The cadastral survey of the Bamna estate was sanctioned late in the season with the special object of ascertaining the special difficulties likely to be met with in the cadastral operations which are to be commenced during the coming field season.

The outturn of work accomplished consists of the survey and record-writing of 44 villages, 34,588 fields with an area of 33 square miles.

The survey is mapped on 111 sheets on the 16″ scale. The average size of the field is 0·60 of an acre.

In order to test the accuracy of the survey, 89 linear miles of *partals* were run by the Survey officers and independently, and 144 linear miles by Inspectors. The total gives an average of 7·15 linear miles of test survey to each square mile of detail. Besides this, independent resurveys of homestead lands were undertaken.

The entries against 497 plots in the records were tested by Survey officers, and 10,071 by Inspectors. The total gives an average of 30·6 per cent.

There were four boundary disputes and 941 disputes affecting the entries in the record against 2,795 plots, all of which have been disposed of during the course of the operations.

Although, generally speaking, the Bihar system of work has been followed in this district, this experimental survey has proved most useful in showing us where we must depart from the Bihar rules and what changes are necessary in the forms. It has also served to train a considerable number of local amins for the work of the future.

There are, of course, several minor differences between the Bihar and Backergunge procedures, but the main differences are—(*a*) In Backergunge, owing to the non-existence of closely, packed village sites we have been able to dispense with the large scale surveys on the 64″=1 mile scale. The huts (each surrounded by its own homestead lands) are scattered all over the area contained within the village boundaries. The homestead lands have therefore been surveyed in position on the 16″ plans, and the huts merely shown in their approximate positions by the usual conventional signs. (*b*) Owing to the intricate nature of the land tenures in Backergunge it has been found necessary to draw up a tenure-holder tree to enable us to trace the landlords through the different grades. In this tree each different sort of tenure is numbered, and it is then only necessary to enter the number in the landlord's column of the *khasra*.

The records and traces have all been completed and handed over to the Settlement Department.

The cost and cost rates are noted in paragraph 3 of the report.

SINGHBHUM DISTRICT.

Traverse Survey.

The survey of the estates of Porahat, Kera, Chainpur and Bandgaon was sanctioned by notifications Nos. 1169T.R., and 770L.R., dated, respectively, 30th June 1900 and 11th February 1901. The survey of the Anandapur estate was sanctioned by the Government of India's letter No. 2131-136, dated 23rd October 1900.

Mr. T. W. Babonau was placed in charge of the survey operations in the district, aad the establishment was recruited by means of transfers from other Bengal survey parties, and by training a number of new men. Field work commenced on the 1st November 1900, and closed on 7th May 1901, when the survey detachment proceeded to recess quarters at Mussoorie.

The outturn of work accomplished consists of 518 villages, area 540 square miles. All the above work is in the estates of Porahat, Kera, Chainpur, and Bandgaon. The survey of the Anandapur estate could not be taken up during the season under report for the reasons noted in paragraph 2.

The origin of survey was the same as that of seasons 1894=96, viz., the intersections N. Lat. 22° 30″ and E. Long. 86° 00″.

To check the angular work, 134 observations for azimuth were taken. The resulting mean magnetic variation is 1°42″ east of the true meridian.

The usual precaution of supplying each surveyor with a spare test chain to ensure good chaining was taken, but a considerable portion of the area traversed was very hilly and jungly (the hills vary on an average from 1,000 to 3,000 feet in height and are covered by protected and reserved forests), and in this tract two chains were run and the use of the subtense bar had to be freely resorted to. The computations have all been completed with the exception of transliteration of the village names which remains to be done after consultation with the Settlement Department.

The usual table of mathematical results showing the value of the angular work and chaining has been computed and submitted to the Surveyor-General's office. The plots of 393 villages were submitted during the field season to the Settlement Department for immediate field cadastral survey, and the remaining villages have been plotted during the recess season.

As there had been no previous revenue survey in this district, the unit for traverse survey was necessarily the village as demarcated locally. The preliminary demarcation is reported to have been good, and the attitude of the inhabitants towards the survey operation has been very satisfactory.

There were 14,405 survey stations in the season's work. All the trijunction points have been marked by 919 stones locally picked up, cut flat at the top with a triangle and dot in centre chiselled thereon. For the intermediate points a stock of 10,000 clay cylinders, which had been ordered before the commencement of the operations, was used up, and then the remaining points marked by local stones with a "broad arrow" cut thereon.

The health of the establishment was very bad throughout the field season. Approximately 50 per cent. of the entire establishment was on the sick list suffering principally from malarial fever.

To complete the programme sanctioned by Government, about 100 square miles of Porahat and the whole of Anandapur, amounting to another 160 square miles, remain for survey. In Porahat however, the main circuit work has been completed in advance, although not taken credit for in this report as it gives no return in village areas.

The whole establishment has worked well and for the reasons given in paragraph 2 of this report, I do not think a larger outturn could have been expected.

The cost and cost rates are noted in paragraph 3 of the report.

PART III.—REPORTS ON MISCELLANEOUS SURVEYS.

Champaran District.

Traverse Survey.

The traverse survey in this district was undertaken for the purpose of the small scale topographical survey necessary to complete the district, and thereby to enable new standard maps to be compiled.

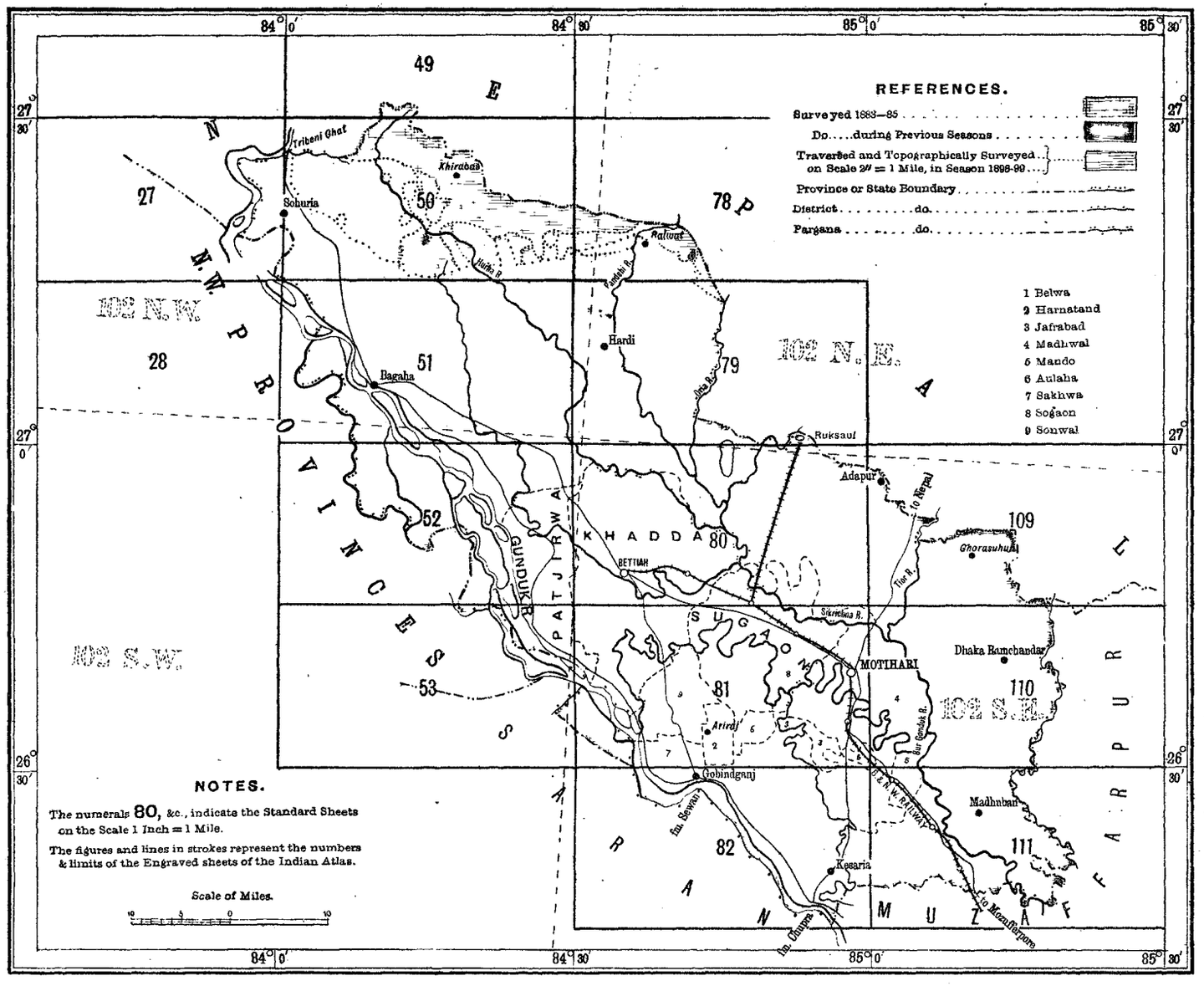
Owing to the extreme unhealthiness of this part of the Champaran district early in the season, the survey detachment was not formed until the 1st January 1901.

Mr. C. S. Gasper was placed in charge, and field work commenced on the 8th of January and was completed on the 30th April.

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DIST. CHUMPARUN.

1900-01. No. 4 PARTY.



Reg. No. 551, S. I. D.—Oct 01.—700.

Photo. S. I. O., Calcutta.

The area accomplished comprises 84 square miles of the Ramnagar forest.

There were 676 theodolite stations in the season's outturn, and these have been marked by pages.

The angular work was checked by 18 observations for azimuth.

The mean magnetic variation calculated from the results of these azimuths is 2° 12′ east of the true meridian. Connections have been made with the great trigonometrical survey and with the previous traverse survey.

The work was plotted as it proceeded on the 2″=1 mile scale on plane table sections for immediate topographical survey. The computations have been completed and despatched to Calcutta.

Topographical Survey.

The topographical survey followed immediately on the traverse work and was based on the traverse stations supplemented by points fixed by interpolation on a plane table by an experienced topographical surveyor. The work was checked by constant inspections of the plane table sections in the field, and also by 57 linear miles of independent *partals*.

The hilly nature of the country necessitated a considerable amount of contouring, and an overlap survey has been carried into the area surveyed by Colonel Tanner in 1883-84-85. The maps have been completed in every respect and despatched to the Bengal Drawing Office.

There is no more work remaining to be done in the Champaran district, and the compilation of the standard sheets is being proceeded with in the Bengal Drawing Office.

There have been considerable difficulties experienced in this small survey. The establishment suffered considerably from fever, and there were a good many desertions. The nature of the country is hilly and jungly and very thinly populated which made it almost impossible to obtain any assistance locally.

The cost and rates of this survey, both traverse and topographical, are noted in paragraph 3 of this report.

Survey and demarcation of the Bhabsa River.

In 1898-99 a survey of the Bhabsa river, which formed the subject of a dispute between the Bettiah and Ramnagar Rajs, was made and a trace thereof submitted to the Settlement Department. Both parties having agreed to abide by the old revenue survey boundary, the Collector of Champaran desired that this boundary should be permanently demarcated.

This work, which is being paid for by the Rajs concerned, was undertaken in connection with the Champaran topographical survey.

The course adopted was as follows:—Firstly, the traverse stations of 1898-99 were opened up, and relaid where necessary, from Bhalu Asthan great trigonometrical survey station to the village of Mahadewa, the starting and closing points of the line under dispute. Secondly, the jungle was cleared along the main lines in the forest area. Thirdly, a field-book showing the measurements of the offsets from the traverse lines to the old revenue survey boundary was compiled. The field-book was made over to a surveyor who erected wooden posts at all bends of the boundary. The surveyor was accompanied by the Bettiah and Ramnagar Raj amins, and masonry pillars will be erected on the spots marked. No demarcation marks were necessary along the main stream of the Bhabsa river which formed part of the line in dispute beeause the river formed the boundary at the time of the old revenue survey.

The cost of this work has been Rs. 307.

Owing to a misunderstanding, a dispute between two villages which forms a continuation of the Bhabsa river dispute was not dealt with during the season under report. This will be seen to next season.

DARBHANGA DISTRICT.

Survey of the Madhubani Municipality.

The municipal authorities having asked for a large scale survey with record of occupancy the Board directed that the work be undertaken under my control.

This survey was carried out by Mr. C. S. Kraal in charge of the Darbhanga Cadastral Section, and completed on the 20th May 1901.

The detail survey was based on 444 theodolite points. Such of these points as of necessity were in the middle of roads were marked by iron pegs driven in flush with the surface.

The entire area of the municipality is 1,164·43 acres of which 489·80 acres (the true urban area excluded from the general operations under the Bengal Tenancy Act) has been surveyed on the 64″=1 mile scale on 16 sheets. The balance of 674·63 acres is *raiyati* area and was surveyed on the 16″ scale in connection with the general operations.

The large scale portion of the work was tested by 214 linear chains of *partal* (approximately 2·7 linear miles) and by independent resurveys of 33 blocks.

There were 7,357 plots in the urban area, and the average size of a plot works out to ·068 of an acre.

The entries against 1,176 of these plots in the record of occupancy have been tested by the survey staff.

In addition to the 16 sheets on the 64″ scale of the urban area, a wall map on 4 sheets on the 16″=1 mile scale has been compiled of the entire municipal area by means of transfer from the 16″ sheets of the *raiyati* area, and reduction by blocking of houses of the 64″ work.

The record of occupancy for the entire municipal area in one serial numbering has been compiled from the *khasras* of the *raiyati* area and from the record written up in the urban area. All the original field sheets and wall map have been completed in every respect, and the traces of the 64″ work and a trace on bank-post paper of the wall map, together with the record of occupancy, handed over to the Settlement Department.

The cost of this work, inclusive of shares of control and charge for instruments, is Rs. 1,804, which is met by the municipality.

Jalpaiguri District.

Relaying boundary of the Baikantapur Estate.

In consequence of a dispute between the Baikantapur estate and the adjoining Government estate, orders were received under Bengal Government letter No. 906L.R., dated 26th February 1900, to relay the boundary according to Mr. Pemberton's survey of 1858-59. Two theodolite surveyors under the orders of Captain Mears were deputed for this work, and reported themselves to the Deputy Commissioner on the 5th of November.

As none of the traverse stations of 1858 could be found, it was necessary to run a small circuit starting from Dharampur Great Trigonometrical station, and following generally the direction of the 1858 traverse lines. This circuit was then plotted on a sheet on which the 1858 stations had already been plotted, and by this means the measurements of the offsets necessary to relay some of the old stations were obtained. Both banks of the Teesta river were then traversed, for, although the left bank was the boundary between the estates, only the right bank had been traversed in 1858. The traverses were plotted on sheets on the 4″ scale, and the position of the left bank of the river, according to the survey of 1858, was then accurately transferred to these sheets, and the measurements of all offsets (formed by the bends of the old boundary) from the present traverse lines carefully scaled off. The bends of the old boundary were then marked on the ground as sites for boundary pillars. Altogether the sites of 110 pillars have been fixed. Of these 22 had to be fixed by reference pillars, owing to the sites lying in the present course of the river. There are 397 theodolite stations and 97 linear miles of chaining in the work necessary for the relaying of the boundary. To check the angular work of the traverses, eight azimuths were observed, and to check the chaining, two chains of different lengths were run. On the 20th April Lieutenant Hirst was deputed to proceed to Jalpaiguri to test the accuracy of the work, and his report was most favourable. The actual length of the boundary affected by the dispute, and which has been relaid, is 37 miles.

The Rani of Baikantapur had purchased a large stock of iron pillars, and the Deputy Commissioner reported that the Rani was anxious to utilize

the surplus stock of 220 iron pillars by marking supplementary points along the boundary. I have pointed out that, although in my opinion the number of sites already marked is amply sufficient, still by the erection of 51 more pillars, every bend, however trivial, will have been marked, and as it will be necessary in any case to send a surveyor next season to remark the sites of some of the reference pillars, the surveyor can also mark these extra 51 points.

The work of the surveyors was completed on the 21st May, and it is much to be regretted that permanent marks were not erected at the sites of the reference pillars, even if time did not permit of permanently marking the sites of the other pillars along the boundary.

There was a misunderstanding between the Deputy Commissioner and the Survey Department as to the responsibility for the erection of the permanent marks. I pointed out to the Deputy Commissioner on the 23rd April that the detailed estimate submitted for the work did not provide for permanent marks, and that in all similar demarcation operations the work of the Survey officers had been to mark the points where permanent marks should be erected, but that for the Survey officers to attend to the erection of the masonry pillars (work which could quite well be done by a local and cheaper agency) would be a waste of power. This misunderstanding was no doubt the reason why no suitable arrangements had been made beforehand for the erection of the permanent marks, but still there was time before the flooding of the river to erect the necessary marks. Lieutenant Hirst, who inspected the work of the surveyors, was accompanied along the boundary by an *amin* deputed by the Deputy Commissioner to note the positions of the survey marks. This *amin*, who was evidently most inefficient, as he was unable afterwards to locate the marks, has been reported to the Deputy Commissioner.

The work of refixing lost sites of reference pillars and fixing supplementary sites next season will be easy as the necessary traverse has been done.

The cost of the work which is met by the Baikantapur estate, was Rs. 4,266.

PART IV.—REPORT ON THE BENGAL DRAWING OFFICE.

During previous seasons the Bengal Drawing Office formed a section of the head-quarters Drawing Office of the Survey of India, and was under the direct control of the Assistant Surveyor-General. From the 10th of January 1901 the direct control has, under the orders of the Surveyor-General and of the Bengal Government, been made over to the Superintendent of Provincial Surveys, Bengal.

Mr. A. B. Smart was in charge from the 1st to 31st October 1900, and Mr. W. H. Penrose for the remainder of the period under report. In addition to the general or supervising section, which deals with the correspondence and accounts, and the cost of which is distributed rateably over the other sections, there are five different sections in the Bengal Drawing Office, viz., (*a*) The 2″ standard mapping, (*b*) Bihar Badar section, (*c*) Thana mapping, (*d*) Reproduction of village maps, and (*e*) Orissa Badar section. Of these, (*a*) and (*b*) are Imperial charges and the rest Provincial.

I will deal with these sections in the above-named order.

The 2″ Standard Mapping Section.

The work of this section consists of the reduction by pentagraph of the 16″ sheets and the fair drawing on the 2″ scale on quarter sections for subsequent reduction by photography to the 1″=1 mile standard maps.

The districts being dealt with are Orissa, Bihar and Chittagong.

In Orissa there are altogether 32 standard sheets, of which six sheets had been previously published, and during the year under report three more sheets were submitted for publication. There are thus remaining 23 sheets which will not be published until the village names have been corrected in accordance with the thana lists received from the Settlement Department. All the quarter sections had been previously drawn, and the work of correction is being proceeded with. If the sheets already published are to agree with the thana lists, a second edition thereof will be necessary.

Of the special publication of 26 sections on the 2″ scale called for by the Under-Secretary to the Government of Bengal in the Irrigation Department

in his letter No. 853I., dated 31st July 1893, 18 sheets were previously published and despatched, and the balance of eight sheets has been published and despatched during the year under report. The cost of this special work is met by the Government of Bengal.

In Bihar, comprising the districts of Saran, Champaran, Muzaffarpur and Darbhanga, there are 40 standard sheets. During the year under report 866 cadastral sheets have been received, and at the close of last year there remained 1,853 sheets to be dealt with, making a total of 2,719 sheets, of which 2,171 have been reduced to the 2″ scale during the year under report. The reduction of 2,662 cadastral sheets have been examined, and 1,542 have been transferred to the 2″ quarter sections.

None of the standard sheets of Bihar have been published previous to the year under report. During the year 12 standard sheets containing Muzaffarpur district only have been submitted for publication. These sheets have not been brought into final accord with the thana lists and traces received from the Settlement Department, and another edition will be necessary as soon as the sheets containing portions of the adjoining districts have been completed to margin, and have all been finally corrected to agree with the thana lists and traces which are not yet finally complete or correct in themselves.

In district Saran six standard sheets, and in Champaran four standard sheets, corrected in final accord with the thana lists have been submitted for publication. All the remaining sheets of Saran and Champaran have been completely drawn, except three in the north of Champaran, which await the incorporation of the topographical survey just accomplished, and three in Saran, in which the *diara* tract is not yet complete.

In Darbhanga a start has been made in the 2″ mapping. Twenty-six new 2″ sections have been projected and some have been partly plotted.

Had it not been for the necessity of comparing the 2″ quarter sections of Bihar with the thana lists and traces, many more sheets could have been published during the year. The comparisons reveal errors also in the thana lists and traces, and all such discrepancies have to be referred back to the Settlement Department for reconcilation.

In Chittagong there are 15 standard sheets, of which six were reported as previously drawn. The remaining nine have been drawn during the year under report, and the whole 15 typed and completed and eight finally examined. None of the Chittagong sheets are, however, ready for publication, as they all contain unsurveyed gaps of jungle and hills, which remain to be filled up from surveys on the 1″ scale of 1861 to 1866. These old surveys show no village or other fiscal boundaries, and when incorporated there will no doubt be considerable difficulties in reconciling the old and new compilations with the thana lists and traces which have yet to be supplied.

Bihar Badar Section.

This section deals with the *badars* or corrections necessary to be made in the original cadastral sheets and area statements in accordance with alterations notified by the Settlement Department.

Since all *badars* of the attestation stage are dealt with by the field parties, which retain the sheets until after attestation for this purpose, the amount of *badar* work left to be done in the Bengal Drawing Office is not much. At the close of last year there were 123 *badars* in hand, and during the year 390 were received. The whole 513 have been completed. This section also dealt with 52 out of 84 *badars* of Chittagong. The remaining 32 are, by order of the Director of Land Records, not to be dealt with.

The correction of original cadastral sheets, area statements, traverse volumes and alphabetical lists of previous season's work in Bihar, in accordance with the thana lists is also being dealt with by this section. This is a heavy item of work, and 2,132 villages with 3,288 sheets, also area statement, &c., have been corrected during the year under report.

Thana Mapping Section.

The work of this section consists of the compiling of separate maps on the 1″ = 1 mile scale of each thana from the reduced prints of the 2″ standard

sheets. The progress in this section consequently depends on that of the 2″ mapping.

There are altogether 76 thanas to be dealt with, viz., 24 of Orissa, 39 Bihar and 13 Chittagong. Of these, 18 (seven of Orissa and 11 Bihar) have been completed, but only 5 of Bihar sent to the Photo. office for reproduction. The progress of this section has been much hampered by the delays in publication of the standard sheets. These delays being due, as already stated, to the comparisons and consequent corrections with the thana lists and traces. In the Muzaffarpur work, for instance, the printed thana lists were received on the 25th of February 1901, but were found to be full of discrepancies. These discrepancie were shown in red on the lists, which were then returned by order of the Director of Land Records to the Settlement Officer. Nine thana lists were despatched, but only three have been received back, and these now show further new corrections. This illustrates the difficulty of this work, which requires constant references between the Settlement and Survey Departments.

In addition to the work already completed, it is expected that by the close of the current financial year 26 more thana maps will be ready, and of these, 18 at least published. By 30th September 1902 the whole of the thana maps of Bihar, with the exception of those of the Darbhanga district, should be published. The thana maps of Chittagong cannot be completed before the end of financial year 1903-1904, because, as already stated, the standard sheets are not complete and the thana lists have yet to be received.

The thana maps of Orissa should also be ready by 30th September 1902.

Reproduction of village maps.

The work of this section consists of tracing from the original cadastral sheets, the village maps of Orissa and Chittagong and submitting the traces to the Photo-Zincographic office of the Survey of India for reproduction of 10 copies of each by the new direct zinc process lately invented by Mr. Vandyke.

In letter No. 1258, dated 11th March 1901, sanction was received to the reproduction of some 21,950 sheets, viz , 14,500 of Orissa, 4,500 of Khurda and 2,950 Chittagong. Of these, 358 only of Khurda had been previously reproduced by the old photographic process, and during the year under report 8,810 sheets have been traced and 8,260 reproduced. Ten copies of each sheet, amounting in all to 89,690 copies, viz., 12,120 Orissa, 42,690 Khurda, and 34,980 of Chittagong, including a special issue of 15 copies of 366 sheets of Chittagong, have been despatched to the Collectors concerned.

During the year under report the Surveyor-General notified that he would be unable to reproduce more sheets in the Photo-Zinco. offices than had been accepted under the original contract (about 8,000 sheets). Therefore, under the orders of the Board, I inspected the new process of reproduction and, after consulting Mr. Vandyke, submitted proposals and estimates for taking over the part of the work as a branch of the Bengal Drawing Office. I pointed out to the Surveyor-General that if the reproduction work were stopped in November 1901, by which date the existing contract would be completed, considerable inconvenience and loss would result as suitable arrangements for the necessary plant and accommodation could not be made in time. The Surveyor-General has agreed to allow the work to proceed at the usual rate of progress until the close of the current financial year, by which date the Bengal Drawing Office will be ready to take over the work.

Orissa Badar Section.

At the close of last year the *badars* of 2,310 villages remained to be dealt with, and during the year under report 215 more were received, making a total of 2,525, out of which 2,368 have been completed during the year.

In last year's report it was stated that the balance of 2,310 villages remaining on 30th September 1900 would be completed in two months, but as the previous average outturn per month was only 600 villages, it is evident that

completion in under four months should not have been expected. As a matter of fact, the work was not completed by 30th November, but the establishment was nevertheless reduced from 43 men to 10 men, and a further reduction to two men only was effected from the 1st April 1901. There is still a good deal of work in this section, for not only have the traverse records to be corrected in accordance with the thana lists, but it was found that a good many boundary corrections had only been carried out in one village and the adjoining village had not been touched. This has been seen to during the year under report.

CHAPTER III.

PART I.—PROGRAMME OF THE BENGAL SURVEYS FOR 1901-1902.

The following is the programme in square miles for the coming season according to orders received up to date:—

District.		Traverse survey.	Cadastral with records.	Topographical.
Sonthal Parganas—Private estates	...	1,069	...	...
Monghyr	...	178	609	41
Patna—Government estates	...	55	...	...
Gaya—Deo Raj	...	100	...	...
Shahabad—Hathwa Raj estates	...	2	...	...
Purnea	...	...	710	...
Bhagalpur	...	1012	...	...
Singhbhum—Porahat and Anandapur	...	260	...	...
Manbhum—Nagarkiari estate	...	50	...	...
Ranchi	...	710	...	...
Backergunge	...	629	574	16
Kalimpong—Government estate	...	180	180	...
Total	...	4,245	2,073	57

The area in the Sonthal Parganas comprises 840 square miles for subsequent cadastral survey, and 229 square miles of traversing of trijunction points only, in order to connect Mr. Craven's surveys for 2″ standard mapping purposes. The traverse area in Monghyr is exclusive of sub-traverses which will have to be run in the portion of the revenue survey mauzas (omitted last season from survey as Srinagar-Baneli villages) of which portions only have been surveyed as the property of the Sringar-Baneli Raj.

PART II.—TOURS OF SUPERINTENDENT, PROVINCIAL SURVEYS.

I have been in the field and on tour for 216 days. I visited every camp and detachment of the Bengal surveys from two to three times in the field and again once at their recess quarter during my monsoon tour in July and August. In addition to the inspections of the surveys under my control, I inspected and tested on the ground a number of Mr. Craven's maps in the Sonthal Parganas and reported to the Surveyor-General their suitability for incorporation in the standard maps. By order of the Bengal Government I visited the survey class of the Behar School of Engineering at Arrah and submitted a report which showed a marked improvement since I last inspected this school five years ago. I also, with the sanction of the Board, accompained the Deputy Surveyor-General to Azamgarh to see the system adopted in the North-Western Provinces Provincial Surveys.

PART III.—SERVICES OF OFFICERS.

Captain A. Mears, Officiating Deputy Superintendent, has been in charge of the Behar traverse section. He has brought a large programme of work to a successful issue and has in every way afforded me all possible assistance. Lieutenant F. C. Hirst, Assistant Superintendent, was appointed for instruction by order of the Surveyor-General. He has been employed principally in the North Behar traverse section both on field work and computations. He has also been put through a two-months' course of practical cadastral surveying and record-writing, and during April and May inspected the work in Jalpaiguri. Lieutenant Hirst has done very good work and takes Captain Mears' place as

the latter officer proceeds shortly on leave. Of the services of the other officers in charge of sections, viz., Messrs. H. Dowman, A. W. Smart, C. S. Kraal, E. F. Berkeley, T. W. Babonau, C. S. Gasper and Mr. W. H. Penrose in charge of the Bengal Drawing Office, it is difficult to speak too highly. Mr. A. W. Smart has accomplished an exceptionally large cadastral programme with records with complete success.

The Sub-Assistants with the field parties, viz., Messrs. Hanby, Causley, Hardinge, Lears, Hart, Judd and Babu Nilmoni Chatterji have all worked well and given complete satisfaction to the officers in charge of their sections. One native Sub-Assistant Superintendent was discovered submitting false returns and suspended by my orders, and after enquiry dismissed from the Department by the Surveyor-General.

Several members of the native establishment are deserving of special mention, and I will bring their services to the notice of the Board in a supplementary letter.

I have the honour to be,

SIR,

Your most obedient servant,

R. T. CRICHTON, CAPT., I.S.C.,

Superintendent of Provincial Surveys in Bengal.

APPENDIX I.

Summary of the outturn of work of the Survey Parties in Bengal for 1900-1901.

District.	Traversing.						Cadastral survey.					Record-writing.			Topographical survey.	
	Number of villages.	Area in square miles.	Linear miles of chaining.	Number of stations at which theodolite was set up.	Number of azimuths.	Number of sub-traverses.	Number of villages.	Fields.	Area in square miles.	Linear miles of test survey.	Number of sheets.	Number of villages.	Fields.	Area in square miles.	Number of villages.	Area in square miles.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Temporarily-settled and Government Estates.																
Sonthal Parganas (Damin-i-koh.)	(a)1,001	735	2,451	18,880	140	646	...	...	...	...	...	...	...	...	...	...
Private Estates.																
Monghyr	453	747	2,766	14,582	85	855	1,184	799,198	741	4,371	2,331	1,180	793,282	729	13	26
Patna	22	60	(b)...	442	(b)...	23	18	8,476	56	202	81	18	8,476	56	4	11
Darbhanga	...	64	177	1,289	...	...	364	768,574	413	2,023	1,242	493	1,086,274	597	...	...
Purnea	854	728	2,981	15,904	109	896	...	...	...	...	...	...	...	...	...	...
Gaya (Maksudpur estate) ...	156	128	606	4,107	...	148	...	...	...	...	...	...	...	...	...	...
Backergunge	786	608	2,701	22,313	82	623	44	34,588	33	233	111	44	34,588	33	...	...
Singhbhum (Porahat, Kera, Chainpur and Bandgaon).	518	540	1,553	16,109	134	396	...	...	...	...	...	...	...	...	...	...
Miscellaneous.																
Champaran	...	84	37	684	18	...	...	...	...	...	...	...	...	...	...	84
Darbhanga (Madhubani town)	1	1	18	444	1	...	1	7,357	1	3	16	1	7,357	1	...	...
Jalpaiguri (Baikantapur boundary).	...	...	97	397	8	...	...	...	...	...	...	...	...	...	...	...
Total ...	3,791	3,695	13,387	95,151	577	3,497	1,611	1,618,193	(c)1,244	6,832	3,781	1,736	1,929,977	1,416	17	121

(a) Includes 22 jungle blocks.
(b) Included in Monghyr figures above.
(c) Exclusive of resurveys and test surveys in village sites.

R. T. Crichton, Captain, I.S.C.,
Superintendent of Provincial Surveys in Bengal.

APPEN

Statement showing the sums expended on each descrip

Description of Work.	TEMPORARILY-SETTLED AND GOVERNMENT ESTATES.				PRIVATE													
	BHAGALPUR DIVISION.				BHAGALPUR DIVISION.				PATNA DIVISION.								BHAGALPUR	
	SONTHAL PARGANAS (DAMIN-I-KOH).				MONGHYR.				PATNA.				DARBHANGA.				PUR	
	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.
1	2				3				4				5				6	
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Stone embedding	2,128	180	92	2,400	890	23	36	949	...	...	...	...	...	...	...	...	1,649	140
Traversing	34,001	2,877	1,475	38,353	18,758	1,639	816	21,213	1,400	118	60	1,578	818	69	35	922	23,118	1,955
	36,129	3,057	1,567	40,753	19,648	1,662	852	22,162	1,400	118	60	1,578	818	69	35	922	24,767	2,095
Survey, cadastral	...	...	...	...	37,431	3,166	1,624	42,221	589	50	26	665	22,222	1,880	964	25,066	...	...
Completion of field map ...	...	...	...	...	2,609	220	113	2,942	135	11	5	151	3,482	295	151	3,928	...	...
Area extraction	...	...	...	...	5,529	469	240	6,238	158	14	7	179	8,799	744	382	9,925	...	...
Traces	...	...	...	...	3,535	299	153	3,987	144	12	6	162	5,373	455	233	6,061	...	...
	...	...	...	...	49,104	4,154	2,130	55,388	1,026	87	44	1,157	39,876	3,374	1,730	44,980	...	...
Record-of-rights (khanapuri)	...	...	...	...	23,427	1,982	1,016	26,425	323	27	14	364	27,441	2,321	1,191	30,953	...	...
Completion of records	...	...	...	...	11,864	1,004	515	13,383	215	18	10	243	17,590	1,488	763	19,841	...	...
Statistics	...	...	...	...	4,469	378	194	5,041	157	13	6	176	5,349	453	232	6,034	...	...
	...	...	...	...	39,760	3,364	1,725	44,849	695	58	30	783	50,380	4,262	2,186	56,828	...	...
Topographical survey	...	...	...	...	359	30	16	405	163	15	8	186	...	...	...	...	...	...
"Sadar" establishment ...	...	...	...	...	...	...	...	...	...	...	...	...	3,608	304	157	4,069	...	...
Arrears	...	...	...	...	...	...	...	...	...	...	...	...	238	21	10	269	...	...
Bengal Drawing Office... ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	359	30	16	405	163	15	8	186	3,846	325	167	4,338	...	...
Total ...	36,129	3,057	1,567	40,753	1,08,871	9,210	4,723	1,22,804	3,284	278	142	3,704	94,920	8,030	4,118	1,07,068	24,767	2,095

DIX II.

tion of work in each district in Bengal during season 1900-1901.

ESTATES.

DIVISION.	PATNA DIVISION.															
NEA.	GAYA—MAKSUDPUR ESTATE.				GAYA—TIKARI WARD'S ESTATE.				GAYA—DEO RAJ ESTATE.				SARAN.			
Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.
		7				8				9				10			
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs	Rs.
71	1,860	633	54	27	714	...	...	...	...	...	...	...	...	...	...	...	...
1,003	26,076	3,884	328	169	4,381	...	...	...	...	51	4	...	55	...	...	...	...
1,074	27,936	4,517	382	196	5,095	...	...	...	...	51	4	...	55	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	80	7	...	87	...	...	...	...	10	...	...	10
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	80	7	...	87	...	...	...	...	10	...	...	10
1,074	27,936	4,517	382	196	5,095	80	7	...	87	51	4	...	55	10	...	...	10

APPENDIX

Statement showing the sums expended on each description of work

Description of Work.	PRIVATE ESTATES—*concld.*								MISCELLANE			
	DACCA DIVISION.				CHOTA NAGPUR.				PATNA			
	BACKERGUNGE.				SINGHBHUM.				CHAMPARAN TOPOGRAPHICAL.			
	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.
	11				12				13			
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Stone embedding	8,080	683	350	9,113	848	72	...	920	...	...	...	...
Traversing	32,457	2,746	1,408	36,611	26,970	2,281	...	29,251	3,577	303	...	3,880
	40,537	3,429	1,758	45,724	27,818	2,353	...	30,171	3,577	303	...	3,880
Survey, cadastral	5,945	503	258	6,706	...	...	...	...	...	...	...	...
Completion of field maps ...	362	31	16	409	...	...	...	...	...	...	...	...
Area extraction	338	29	14	381	...	...	...	...	...	...	...	...
Traces	49	3	2	54	...	...	...	...	...	...	...	...
	6,694	566	290	7,550	...	...	...	...	...	...	...	...
Record-of-rights (khanapuri)	5,160	437	224	5,821	...	...	...	...	...	...	...	...
Completion of records	1,112	94	48	1,254	...	...	...	...	...	...	...	...
Statistics	168	14	8	190	...	...	...	...	...	...	...	...
	6,440	545	280	7,265	...	...	...	...	...	...	...	...
Topographical surveys ...	...	...	...	...	...	...	...	...	4,746	401	...	5,147
"Badar" establishment ...	...	...	...	...	...	...	...	...	...	...	...	...
Arrears	...	...	...	...	...	...	...	...	...	...	...	...
Bengal Drawing Office... ...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	4,746	401	...	5,147
Total ...	53,671	4,540	2,328	60,539	27,818	2,353	...	30,171	8,323	704	...	9,027

II—*continued.*

in each district in Bengal during season 1900-1901—continued.

OUS.

DIVISION.								RAJSHAHI DIVISION.				POLITICAL DEPARTMENT.			
CHAMPARAN BABSA RIVER DISPUTE.				MADHUBANI MUNICIPALITY.				JALPAIGURI-BAIKANTAPUR BOUNDARY.				TRAINING OF KUMAR PALDEN.			
Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.
14				15				16				17			
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
272	23	12	307	147	12	6	165	3,782	320	164	4,266	...	...	...	...
272	23	12	307	147	12	6	165	3,782	320	164	4,266	...	...	...	...
...	...	...	...	1,453	123	63	1,639	...	...	...	...	47	10	2	59
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	1,453	123	63	1,639	...	...	...	...	47	10	2	59
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
272	23	12	307	1,600	135	69	1,804	3,782	320	164	4,266	47	10	2	59

APPENDIX

Statement showing the sums expended on each descrip

(BENGAL DRAW

Description of Work.	IMPERIAL CHARGES.								PROVINCIAL			
	2" Mapping.				Bihar Badars.				Re-production of Village Maps.			
	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.
	18				19				20			
	Rs	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Stone embedding	...	...	...	...	...	...	...	...	...	...	...	...
Traversing	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...
Survey, cadastral	...	...	...	...	...	...	...	...	...	...	...	...
Completion of field maps ...	...	...	...	...	...	...	...	...	...	...	...	...
Area extraction	...	...	...	...	...	...	...	...	...	...	...	...
Traces	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...
Record-of-rights (khanapuri) ...	...	...	...	...	...	...	...	...	...	...	...	...
Completion of records ...	...	...	...	...	...	...	...	...	...	...	...	...
Statistics	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...
Topographical survey	...	...	...	...	...	...	...	...	...	...	...	...
"Badar" establishment ...	...	...	...	...	...	...	...	...	...	...	...	...
Arrears	...	...	...	...	...	...	...	...	...	...	...	...
Bengal Drawing Office	6,095	516	...	6,611	1,077	91	...	1,168	24,997	2,115	...	27,112
	6,095	516	...	6,611	1,077	91	...	1,168	24,997	2,115	...	27,112
Total ...	6,095	516	...	6,611	1,077	91	...	1,168	24,997	2,115	...	27,112

II—*concluded.*

tion of work in each district in Bengal during season 1900-1901—concluded.

ING OFFICE.											
CHARGES.								TOTAL			
THANA MAPPING.				ORISSA BADARS.							
Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.	Actual cost.	Superintendent of Surveys' pay and office.	Four per cent. cost of instruments.	Total.
21				22				23			
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
...	...	...	...	...	...	...	...	14,229	1,152	576	15,956
...	...	...	...	...	...	...	...	1,49,235	12,675	5,148	1,67,058
...	...	...	...	...	...	...	...	1,63,463	13,827	5,724	1,83,014
...	...	...	...	...	...	...	...	67,687	5,732	2,937	76,356
...	...	...	...	...	...	...	...	6,588	557	285	430
...	...	...	...	...	...	...	...	14,824	1,256	643	16,723
...	...	...	...	...	...	...	...	9,101	769	394	10,264
...	...	...	...	...	...	...	...	98,200	8,314	4,259	1,10,773
...	...	...	...	...	...	...	...	56,351	4,767	2,445	63,563
...	...	...	...	...	...	...	...	30,781	2,604	1,336	34,721
...	...	...	...	...	...	...	...	10,143	858	440	11,441
...	...	...	...	...	...	...	...	97,275	8,229	4,221	1,09,725
...	...	...	...	...	...	...	...	5,268	446	24	5,738
...	...	...	...	...	...	...	...	3,608	304	157	4,069
...	...	...	...	...	...	...	...	328	28	10	366
730	62	...	792	3,300	279	...	3,579	36,199	3,063	...	39,262
730	62	...	792	3,300	279	...	3,579	45,403	3,841	191	49,435
730	62	...	792	3,300	279	...	3,579	4,04,341	34,211	14,395	4,52,947

R. T. CRICHTON, CAPTAIN, I.S.C.,
Superintendent of Provincial Surveys, Bengal.

B. S. Press—2868J—425—17-12-1901.—C. A. P.

REVENUE DEPARTMENT.

LAND REVENUE.

CALCUTTA, THE 18TH MARCH 1902.

RESOLUTION—No. 1780.

READ—

Letter No. 65A., dated the 20th January 1902, from the Board of Revenue, submitting with a note, the Survey and Settlement Reports for the year ending 30th September 1901.

THE Survey and Settlement Reports for the year ending 30th September 1901, are more concise than the Reports for the preceding year. Remarks will be separately communicated to the Board of Revenue with a view to the further curtailment of these Reports; and mistakes in the Appendices to the Settlement Report will be pointed out.

2. Important surveys and settlements were in progress during the year under the Superintendent of Provincial Surveys in nine districts situated in four Commissioners' Divisions, and under the Director of Land Records in ten districts contained in six of the Divisions.

The outturn of traverse survey for the year was 3,695 square miles, and of topographical survey 121 square miles. There were some changes of programme under this head, and larger areas were traversed, especially in Monghyr and Patna, than had been originally provided for, while in other districts the programme was not quite fulfilled. The outturns generally obtained, in spite of difficulties occasioned by sickness of the surveyors in unhealthy tracts, and also by the indifference of the people at the beginning of the work in the preliminary demarcation of new areas, are sufficient and satisfactory. With reference to paragraph, 17 of the Board's remarks, the Lieutenant-Governor wishes to know whether the District Officer of Purnea was called to account for not giving the required help in the survey work, and what explanation he may have given. Cadastral maps were made under the direction of the Superintendent for 1,244 square miles, and records were written for 1,416 square miles. The programme under these heads was fully attained or exceeded in all districts. The Settlement Report does not show for all districts how far the programme for the year was fulfilled, but good general progress was made in attestation of records for 1,212 villages and in publication of draft and final records respectively for 2,309 and 1,309 villages.

3. The Board have furnished some useful comments on the cost—rates of survey and settlement in the various districts. The cost of traverse survey ranged from Rs. 29·4 a square mile in Monghyr and Patna to Rs. 75·2 in Backergunge; in the latter district the work has been newly started, labour is expensive, and on account of the nature of the country boats have to be kept for the surveyors. For cadastral survey and record-writing, the rates of cost were Rs. 129·1 to the square mile in Monghyr and Patna, and Rs. 189·2 in Darbhanga. The Board consider that "the aim of the Survey Department should be to reduce the cost to Rs. 160 for all survey work, or 4 annas an acre." This view, however, loses sight of the fact that the rate of cost must depend on the area under survey, the size of the fields, the number of tenancies to the square mile, and other matters which vary from district to district. The Lieutenant-Governor will have another opportunity of examining the question of the incidence of survey and settlement cost in Bengal operations, as compared with cost in other Provinces in connection with a special report which is to be submitted to the Government of India on this subject. Sir John Woodburn can at once say, however, that he would not be prepared to consent to a decrease of supervision which would

jeopardise the efficiency of the survey and settlement work of which the value depends upon its accuracy and honesty.

4. Among other interesting subjects dealt with in the two Reports, the Lieutenant-Governor desires to notice the following matters :—

(1) *The difficulty of demarcation of villages in deara tracts.*—This matter is dealt with by the Superintendent of Surveys in paragraph 5 of his Report and by the Board in paragraph 14 of their note. Captain Crichton's proposals for the traverse work in such areas appear to be sensible, but they do not meet the whole difficulty; and the Lieutenant-Governor will await the Board's proposals as to the necessity of amendment of the law with regard to the definition of a village contained in section 3(10) of the Bengal Tenancy Act.

(2) *The maintenance of boundary marks.*—(Paragraph 9 of the Settlement Report and paragraph 19 of the Board's note.) Legal questions on this subject have been referred by the Board to the Legal Remembrancer. The Government of India have pressed for a report on the subject, and it will be dealt with as early as possible.

(3) *The lasting value of Mr. Finucane's settlement of 1878 in the Alapur Pargana of Darbhanga.*—(Paragraph 35 of the Settlement Report and paragraph 21 of the Board's note). The Settlement Officer reports that in this area the settlement staff found practically no rent disputes, that the rents recorded by Mr. Finucane had remained unchanged to the present day, and that disputes regarding other matters were not numerous, and were easily settled to the satisfaction of all concerned by a reference to Mr Finucane's papers. The Lieutenant-Governor agrees in the Board's remark that these results are evidence of the value of settlements, even without Government revision.

(4) *Recovery of cost of Survey and Settlement.*—(Paragraphs 48 and 103 to 105 of the Settlement Report and paragraph 22 of the Board's note). The recovery work in Darbhanga, where only Rs. 198 now remains due out of a demand of Rs. 4,37,880 payable by nearly half a million landlords and raiyats, has been extraordinarily successful. This work has not been so successful in Chittagong, no doubt because of the greater intricacy of the tenures in that district, and because the work was undertaken some time after the records had been finally published.

(5) *The record of Proprietor's private land in Darbhanga.*—The Lieutenant-Governor has been struck with the small number of parcels of "proprietor's private land" recorded in Darbhanga (Appendix IV of the Settlement Report). In 983 villages in Darbhanga for which records were attested in 1900-1901, only eight such parcels of true *sir* land were recorded as against 9,016 parcels of land recorded as held by the proprietor but not private land. It is desirable that the principles on which this classification has been made should be examined, and the Lieutenant-Governor will await a report from the Board on this subject.

(6) *The settlement of rents on the private estates in the Sonthal Parganas.*—The Lieutenant-Governor has read with interest the extracts from Mr. H. McPherson's Report (contained in pages 15 to 17 of the Settlement Report), with regard to transfers, and with regard to the rents settled in the Sonthal Parganas zamindary estates. The Settlement Officer's action in the matter of cancellation of transfers appears to have been careful and considerate, but there are other questions which need separate reference and discussion.

5. The Lieutenant-Governor thanks Mr. Lyon and Captain Crichton for their zealous and capable supervision of the survey and settlement operations of the Province. He also notices with pleasure the commendations which these officers have recorded of the work of the officers of the Survey and Settlement staff.

ORDERED that this Resolution be published in the *Calcutta Gazette* and that a copy of it with copies of the two Reports be submitted to the Government of India.

By order of the Lieutenant-Governor of Bengal,

W. C. MACPHERSON,
Offg. Secretary to the Govt. of Bengal.

No. 1781.

COPY, with a copy of the Survey Report, forwarded to the Deputy Surveyor-General in Charge, Revenue Branch, Survey of India, for information.

No. 1782.

COPY, with a copy of the Settlement Report, forwarded to the Appointment Department of this Government for information, with special reference to paragraph 5 above.

No. 1783.

COPY forwarded to the Secretary to the Board of Revenue, Land Revenue Department, for the information of the Board, with special reference to paragraphs 2, 4(1) and 4(5) above. A separate letter will be addressed to the Board with reference to paragraph 4(6) of the Resolution.

By order of the Lieutenant-Governor of Bengal,

L. E. B. COBDEN-RAMSAY,
Under-Secretary to the Govt. of Bengal.

CALCUTTA,
The 18th March 1902.

B. S. Press—8013C—991—22-3-1902—E. D'S.

ANNUAL REPORT

ON THE

SURVEY OPERATIONS IN BENGAL

DURING THE YEAR

1901-1902.

From 1st October 1901 to 30th September 1902.

Calcutta:
PRINTED AT THE BENGAL SECRETARIAT PRESS.
1902.

Published at the BENGAL SECRETARIAT BOOK DEPÔT,
Writers' Buildings, Calcutta.

OFFICIAL AGENTS.

In India—

MESSRS. THACKER, SPINK & Co., Calcutta and Simla.
MESSRS. NEWMAN & Co., Calcutta.
MESSRS. HIGGINBOTHAM & Co., Madras.
MESSRS. THACKER & Co., LD., Bombay.
MESSRS. A. J. COMBRIDGE & Co., Bombay.
THE SUPERINTENDENT, AMERICAN BAPTIST MISSION PRESS, Rangoon.
MRS. RADHABAI ATMARAMS AGOON, Bombay
MESSRS. S. K. LAHIRI & Co., Printers and Book-sellers, College Street, Calcutta.
RAI SAHIB M. GULAB SINGH & SONS, Proprietors of the Mufid-i-am Press, Lahore, Punjab.
MESSRS. V. KALYANARAMA IYER & Co., Book-sellers, &c., Madras.
MESSRS. D. B. TARAPOREVALA, SONS & Co., Book-sellers, Bombay.
MESSRS. G. A. NATESAN & Co., Madras.

In England—

MR. E. A. ARNOLD, 37 Bedford Street, Strand, London.
MESSRS. CONSTABLE & Co., 2 Whitehall Gardens, London.
MESSRS. SAMPSON LOW, MARSTON & Co., St. Dunstan's House, Fetter Lane, London.
MESSRS. LUZAC & Co., 46 Great Russell Street, London.
MESSRS. KEGAN PAUL, TRENCH, TRÜBNER & Co., Charing Cross Road, London.
MR. B. ALFRED QUARITCH, 15 Piccadilly, London.
MESSRS. P. S. KING & SON, 2 & 4 Great Smith Street, Westminster, London.
MESSRS. H. S. KING & Co., 65 Cornhill, London.
MESSRS. WILLIAMS AND NORGATE, Oxford.
MESSRS. DEIGHTON BELL & Co., Cambridge.

On the Continent—

MESSRS. R. FRIEDLÄNDER & SOHN, Berlin, N. W., Carlstrasse, 11.
MR. OTTO HARRASSOWITZ, Leipzig.
MR. KARL HIERSEMANN, Leipzig.
MR. ERNEST LEROUX, 28 Rue Bonaparte, Paris.
MR. MARTINUS NIJHOFF, The Hague.

[illegible, pages 20]

INDEX TO CONTENTS.

CHAPTER I.

PAGE.

GENERAL REMARKS ON THE PROVINCIAL SURVEYS 1

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND RECORDS OF RIGHTS IN TEMPORARILY-SETTLED AND GOVERNMENT ESTATES UNDER SETTLEMENT OF RENTS AND LAND REVENUE.

RAJSHAHI DIVISION, DARJEELING DISTRICT—KALIMPONG—TRAVERSE SURVEY . 2
„ „ „ CADASTRAL „ . *ib.*
PATNA DIVISION. . PATNA DISTRICT—GOVERNMENT ESTATES—TRAVERSE SURVEY . 3

PART II.—REPORTS ON SURVEYS AND RECORDS OF RIGHTS IN PRIVATE ESTATES.

BHAGALPUR DIVISION — MONGHYR DISTRICT— TRAVERSE SURVEY . . . 3
„ „ CADASTRAL „ . . . 4
„ „ TOPOGRAPHICAL „ . . . *ib.*
PURNEA „ TRAVERSE „ . . . *ib.*
„ „ CADASTRAL „ . . . 5
BHAGALPUR „ TRAVERSE „ . . . *ib.*
„ „ TOPOGRAPHICAL „ . . . 6
PATNA „ . GAYA „ DEO WARD'S ESTATE—TRAVERSE SURVEY . . . . *ib.*
DACCA „ . BACKERGUNGE „ TRAVERSE SURVEY . . . *ib.*
„ „ CADASTRAL „ . . . 7
BHAGALPUR „ . SONTHAL PARGANAS „ TRAVERSE „ . . . 8
CHOTA NAGPUR „ . SINGHBHUM „ „ „ . . . *ib.*
RANCHI „ „ „ . . . 9

PART III.—REPORTS ON MISCELLANEOUS SURVEYS.

BHAGALPUR DIVISION MALDA DISTRICT— TRAVERSE SURVEY . . . 9
PATNA „ CHAMPARAN „ REDEMARCATION . . . *ib.*
BHAGALPUR „ MONGHYR „ MONGHYR FORT SURVEY . . . 10
„ „ GOVERNMENT ESTATES SURVEY . . *ib.*
„ „ REDEMARCATION OF MAUZA HARKAR *ib.*
PATNA „ SHAHABAD „ TRAVERSE, SURVEY HATHWA VILLAGES *ib*
„ „ „ TAUFIR BHEDIA . . *ib.*
„ „ „ UMARPUR DIARA . . 11
DARBHANGA „ „ SHAH ALAMPUR . . *ib.*
RAJSHAHI „ JALPAIGURI „ BAIKANTHPUR ESTATE BOUNDARY . *ib.*

PART IV.—REPORT ON THE BENGAL DRAWING OFFICE.

STANDARD MAPPING SECTION 11
BIHAR "BADAR" „ 12
THANA MAPPING „ . . . . . *ib.*
REPRODUCTION OF VILLAGE MAPS . . . . . *ib.*
ORISSA "BADAR" SECTION 13

CHAPTER III.

	Page.
PART I.—TOURS OF THE SUPERINTENDENT OF PROVINCIAL SURVEYS	13
PART II.—SERVICES OF OFFICERS	*ib.*

LIST OF APPENDICES.

APPENDIX I.—PART A.—SUMMARY OF OUTTURN OF WORK		15
	PART B.—STATEMENT OF OUTTURN AND COST RATES	16
„ *II.*—EXPENDITURE STATEMENT		17

LIST OF INDEX MAPS.

PROVINCE OF BENGAL	*To face page*		1
DARJEELING DISTRICT	„	„	2
PATNA „	„	„	3
MONGHYR „	„	„	*ib.*
PURNEA „	„	„	4
BHAGALPUR „	„	„	5
GAYA „	„	„	6
BACKERGUNGE „	„	„	7
SONTHAL PARGANAS „	„	„	8
SINGHBHUM „	„	„	9
RANCHI „	„	„	*ib.*

ANNUAL REPORT

OF

THE SUPERINTENDENT OF PROVINCIAL SURVEYS, BENGAL,

ON THE

SURVEY AND RECORD OF RIGHTS OPERATIONS IN BENGAL

DURING THE YEAR 1900-1901.

No. $\frac{2337}{R\text{-}7—96}$.

FROM MAJOR R. T. CRICHTON, I.S.C.,

Superintendent of Provincial Surveys in Bengal,

TO THE SECRETARY TO THE BOARD OF REVENUE, LOWER PROVINCES.

Dated Dinapore, the 27th November 1902.

SIR,

I HAVE the honour to submit the Report on the Survey Operations in Bengal during the past survey year, namely from the 1st October 1901 to 30th September 1902.

2. I have been in charge for the whole period under report.

CHAPTER I.

GENERAL REMARKS.

3. The outturn of the year, viz. 4,171 square miles traverse, 2,132 square-miles cadastral, 2,078 square miles of record-writing, and 23 square miles of topographical survey, is comprised in major operations in 10 districts and 9 minor surveys. The outturn accomplished in each of these operations is fully up to the programme, except for a failure of 66 square miles of record-writing in Backergunge and of 30 square miles of traverse in Ranchi. The reasons for these failures are given in the reports on these operations, and, as areas in excess of the approximate programmes have been accomplished in the Monghyr *diara* and Kalimpong survey, the grand total of outturn of the Bengal Surveys is fully up to the total programme.

Establishments.

4. The programme of the year was considerably larger than that of the foregoing year, but the necessary extra establishments were provided by the training of theodolite surveyors and chaining "tindals" at Dumka, and by the training at Kalimpong and Barisal of local men as "amins" for the Darjeeling and Backergunge surveys.

Changes during the year.

5. The only changes worth mentioning are (*a*) simplication of village site surveys, (*b*) provision of another office house for the Bengal Drawing Office,

and taking over of the entire reproduction of village maps work, (*c*) introduction of an abridged khasra form for Bengal surveys, and (*d*) experiment in progress with a view to cheapening cost of thana maps of the foregoing. As regards (*a*), the survey of village sites on the 16″ scale has resulted in a considerable saving; as regards (*b*) the changes in the Bengal Drawing Office are explained in the report thereon; as regards (*c*) a new khasra form which will much reduce the work of record-writing and lower cost rates has been proposed by Mr. N. Beatson-Bell, Settlement Officer of Backergunge, and has been approved by the Board, and as regards (*d*) it is hoped that if the experiments still in progress with a view to production of thana maps by the Vandyke process prove successful, that the cost of a thana map will be lowered from Rs. 120 to Rs. 40.

Badar establishments.

6. As during last season, the settlement badars are still dealt with by the field parties. All this work is absolutely up to date.

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND RECORDS OF RIGHTS IN TEMPORARILY-SETTLED AND GOVERNMENT ESTATES UNDER SETTLEMENT OF RENTS AND LAND REVENUE.

MAJOR SETTLEMENTS.

DISTRICT DARJEELING—KALIMPONG GOVERNMENT ESTATE.

Traverse Survey.

7. This survey was ordered in Government Notification No. 1588T.—R., dated 8th October 1901. During August and September 1901 the training of local men was undertaken at Kalimpong, and altogether about six men were trained for theodolite work and 80 for cadastral survey. Early in October, Mr. S. F. Norman took charge of the newly formed detachment, and the traverse work was proceeded with. Owing to the difficult nature of the country and the inexperience of the local sub-surveyors, the work proceeded very slowly.

The estate is divided into 48 blocks and each block was treated as a "mauza" and traversed as such with sub-traverses when necessary. The area accomplished was 182 square miles at a cost of Rs. 11,146, which gives a cost rate of Rs. 61·2 per square mile, which, considering that the subtense bar method of deriving distances had to be resorted to throughout, is not excessive.

There are 6,312 theodolite stations in the area, and these have been marked by 139 stones, 440 cylinders, and 5,733 pegs. The traverses were connected to and corrected in accordance with the values of 23 Great Trigonometrical stations. The computations have all been completed, and the work has proved well.

Cadastral Survey.

8. The same detachment undertook the cadastral survey and also the record-writing under the supervision of Mr. C. Bell, the Settlement Officer.

The area of the estate originally reported for survey was 133 square miles with 9,800 plots. This estimate proved to be too low, as the area actually accomplished was 182 square miles with 31,782 plots.

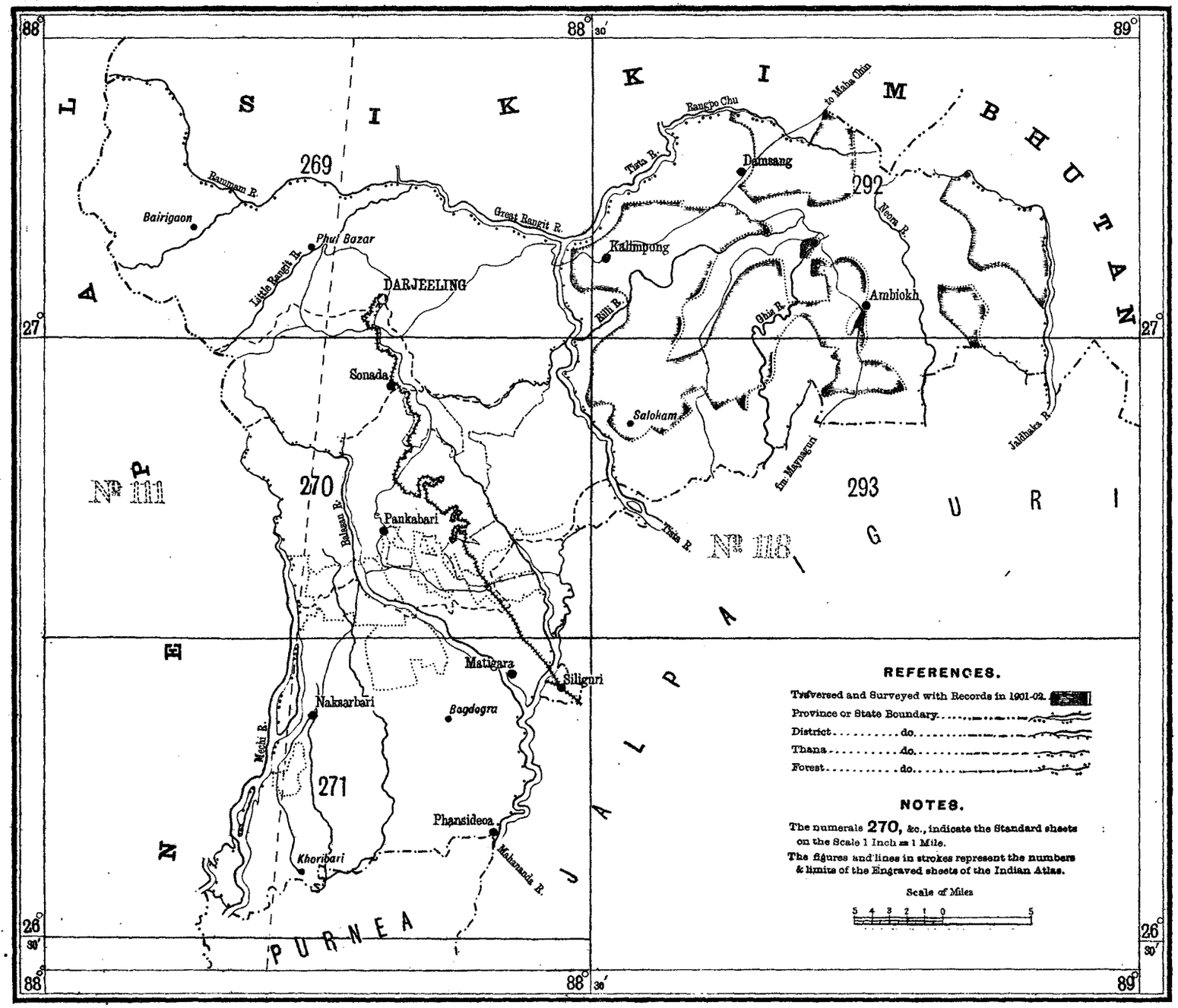
The survey was very difficult, and here again the inexperience of all and the unsuitability of some of the locally trained establishment delayed progress considerably. The more inefficient of the local men were discharged, and 25 Garhwal and a few Bihar amins imported. After this progress was fairly rapid.

The survey work was tested by 1,182 linear miles of "partal," which gives an incidence of 6·5 linear miles of test survey to each square mile of

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT DARJEELING.

1901-02. KALIMPONG DETACHMENT.



Reg. No, 379, Bengal —Dec. 02.—425.

Photo. S. I. O., Calcutta.

No. 999-S. 02.

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DIST. PATNA.

1901-02. No. 4 PARTY.

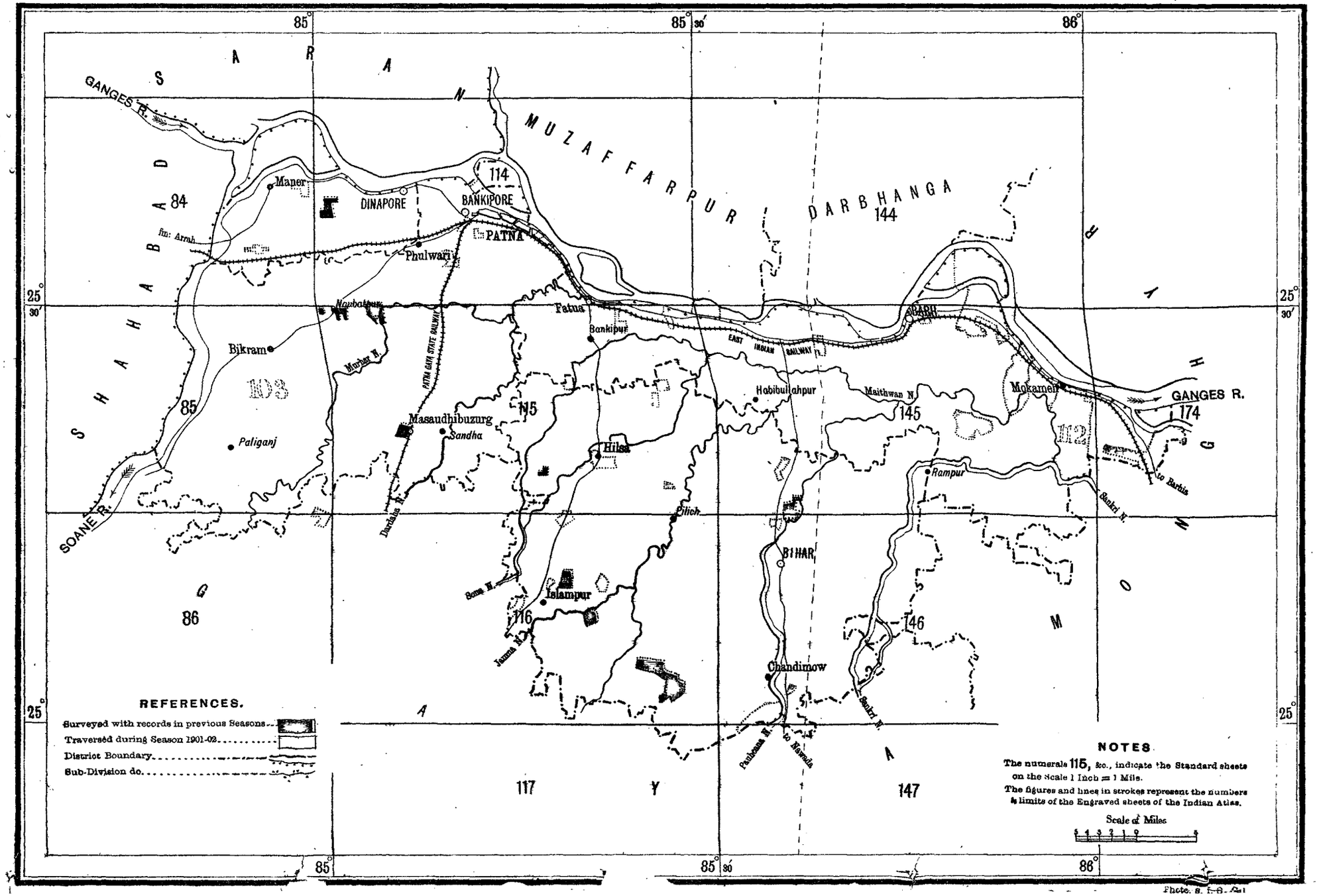
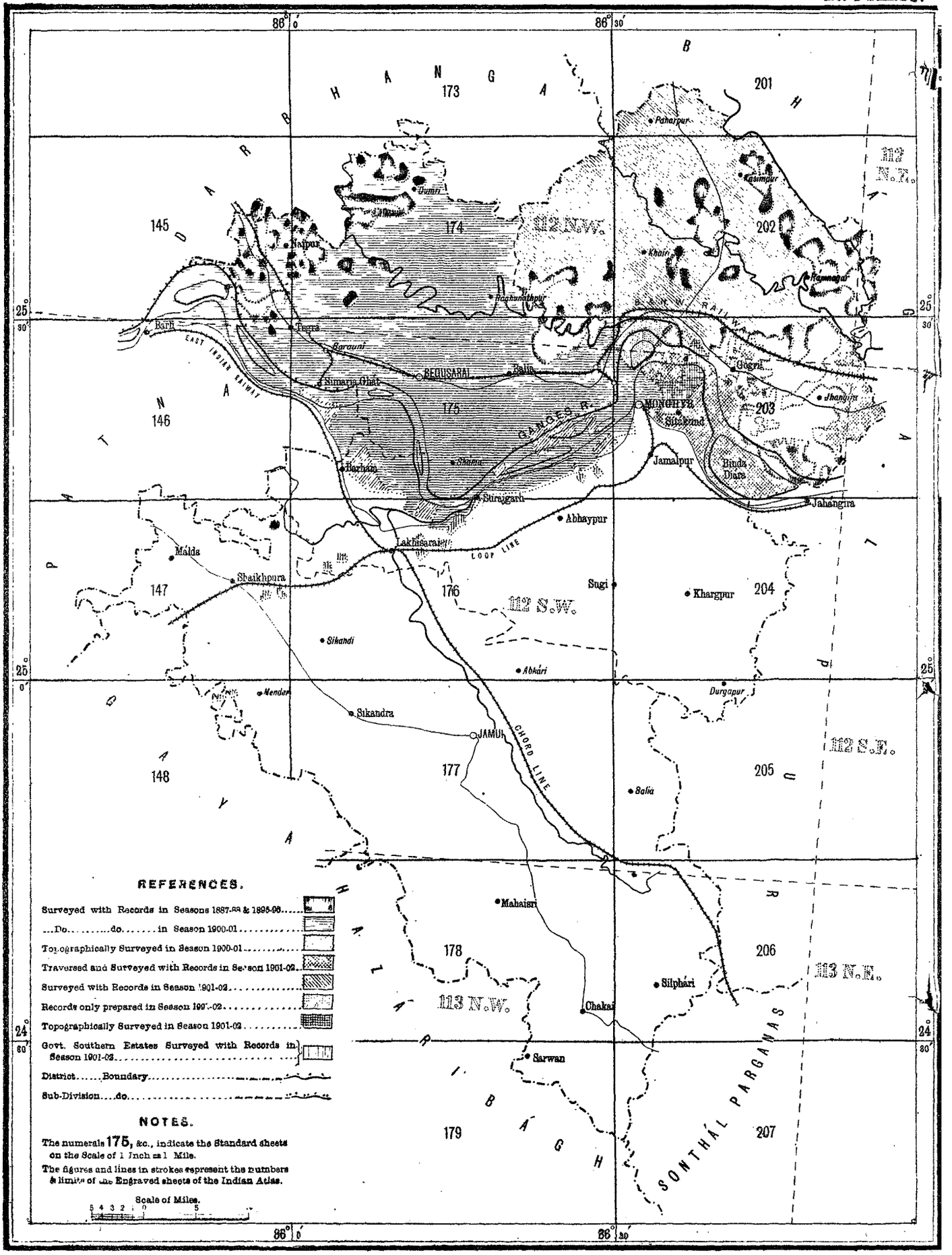


Photo. S. I. S. Cal

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DIST. MONGHYR.

1901-02. No. 4 PARTY.



REFERENCES.

Surveyed with Records in Seasons 1887-88 & 1895-96.....

...Do.....do.....in Season 1900-01.....

Topographically Surveyed in Season 1900-01.....

Traversed and Surveyed with Records in Season 1901-02.....

Surveyed with Records in Season 1901-02.....

Records only prepared in Season 1901-02.....

Topographically Surveyed in Season 1901-02.....

Govt. Southern Estates Surveyed with Records in Season 1901-02.....

District.....Boundary.....

Sub-Division....do.....

NOTES.

The numerals **175**, &c., indicate the Standard sheets on the Scale of 1 Inch = 1 Mile.

The figures and lines in strokes represent the numbers & limits of the Engraved sheets of the Indian Atlas.

Scale of Miles.

5 4 3 2 1 0 5

Reg. No. 370, S. I.—Dec. 02.—425

Photo. S. I. O., Calcutta.

No. 994-S. 02.

detail, and this should ensure the work being first class. The entries against 7,358 plots were tested by the survey staff, which gives a percentage of 23 on the whole number of plots.

On the completion of the field work on 23rd July 1902, Mr. N. Bedford, who had relieved Mr. Norman, handed over the maps and records to the Settlement Officer for the completion of records and compilation of statistics.

The cost of the cadastral survey with record-writing has been Rs. 29,811, which gives a cost rate of Rs. 163-8 per square mile. As the khanapuri work was very simple, by far the greater portion of the cost was incurred on the surveying. The expenditure on surveying also includes cost of providing labour, which was very high.

Patna District—Government Estates.

Traverse Survey.

9. The traverse survey of 52 Government estates covering an area of 47 square miles, but scattered all over the district, was undertaken with a view to providing plots of the detail survey to be undertaken by the Settlement Department. The entire programme was accomplished by the Bihar Traverse camp at a cost of Rs. 2,493, which gives a rate of Rs. 53 per square mile. The preliminary demarcation, which was supposed to have been ready for the survey party, was very bad, and the usual difficulties in locating the estates was experienced.

There were altogether 1,775 theodolite stations which have been marked by 220 stones, 1,105 cylinders, and 450 pegs.

The plots were made over to the Settlement Officer during the field season, and the computations, which have all been completed, prove well.

PART II.—REPORTS ON SURVEYS AND RECORDS OF RIGHTS IN PRIVATE ESTATES.

MAJOR SETTLEMENTS.

Monghyr District.

Traverse Survey.

10. The traverse programme in this district consisted of the completion of a small area of uplands in thana Gogri and of the whole of the Ganges Diara, as far as the southern high banks of the river. As all this area was required for immediate cadastral survey, the whole strength of the Bihar Traverse section under Lieutenant F. C. Hirst was put into Monghyr early in the season.

The area accomplished, viz., 196 square miles in 148 villages, was nearly all low lying, and therefore only a few trijunction points have been permanently marked by stones. There are 3,294 theodolite stations in the area surveyed, and these have been marked by 262 stones, 1,197 pegs, and 1,835 cylinders. Nearly all the stones were embedded along the southern high bank of the Ganges river so as to provide a line of permanent marks for future connections and to allow of boundaries being relaid when necessary in the *diara*.

The demarcation was very bad, partly owing to the greater portion of the area being *diara*, but also owing to the apathy of the Srinagar-Baneli Raj villagers, who, being aware that these villages were excluded from the present operations, would not take the trouble to demarcate these boundaries.

A great deal of trouble was experienced in connecting our traverses with those of the Srinagar-Baneli survey of 1885-86-87. In many cases the old marks were forthcoming, but as they had apparently been removed from the old traverse stations on to the actual boundaries, connection with the old traverse survey was impossible.

The expenditure was Rs. 7,283 which gives a rate of Rs. 37·1 per square mile, but it must be remembered that this expenditure includes the cost of

relaying stations along the Srinagar-Baneli villages for a total length of about 80 miles.

The health of the establishment was fairly good.

Two stations of the Great Trigonometrical Survey were connected with, and the angular work was checked by the observations of 20 azimuths. The mean magnetic variation works out to 1° 38′ east of the true meridian.

The computations have all been completed in every respect. The work has proved well and the usual tables of mathematical results are under submission to the Surveyor-General's Office.

Cadastral Survey.

11. The cadastral camp under Mr. A. W. Smart was employed on the completion of the Monghyr District as far south as the southern high bank of the Ganges river.

The area cadastrally surveyed was 640 square miles and the record-writing of the same, also of 12 square miles surveyed only during the previous season, was accomplished.

The survey was checked by 3,294 linear miles of "partal," which gives an incidence of 5·05 linear miles of test survey to each square mile of detail survey.

The entries against 139,803 plots were checked by the survey staff, which gives an average of 29 per cent. of the whole number of plots khanapuried.

There were 343 boundary desputes, all of which have been decided by the Settlement Department. There were 14,430 disputes affecting entries in the records and 14,049 have been settled, the balance of 381 remaining over to be dealt with at the attestation stage.

The attendance of the zamindars and raiyats was far better than in previous seasons, and only a few process-fee notices and fines were found necessary.

The health of the establishment during the field season was very good, but malarial fever and dysentry were prevalent during recess.

There are no particular difficulties worth mentioning, except the difficulty of connecting on to the 1887-88 survey of the Srinagar-Baneli villages. Owing to the total absence of the old traverse stations an overlap detail survey of about 20 square miles along the Srinager-Baneli village boundaries was found necessary, the cost of which, viz. Rs. 935, has been included in the total expenditure. There were several disputes on the Srinagar-Baneli boundary owing to the Raj having encroached considerably in the 1887-88 survey.

The entire season's work has been completed in every respect, and the records made over to the Settlement Department.

The expenditure on cadastral survey and record-writing has been Rs. 78,235, which gives a cost rate of Rs. 121-4, which is satisfactory, and is the lowest reached so far in the Bengal surveys.

A considerable saving was effected by the new rules of the survey of villages sites in the 16″ = mile scale. During the year under report the expenditure on large scale surveys of village sites was only Rs. 134, where the average for the foregoing three years was Rs. 2,300 a year.

Topographical Survey.

12. The permanently settled estates which fall into the Ganges diara were surveyed topographically on the 16″ = 1 mile scale.

The outturn accomplished comprises 55 villages 20 square miles. The survey has been partalled by 101 linear miles of check survey, which gives an incidence of 5·18 linear miles to each square mile of detail.

There were 31 boundary disputes, all of which have been settled.

The expenditure was Rs. 346, which gives a cost rate of Rs. 17·3 per square mile.

DISTRICT PURNEA.

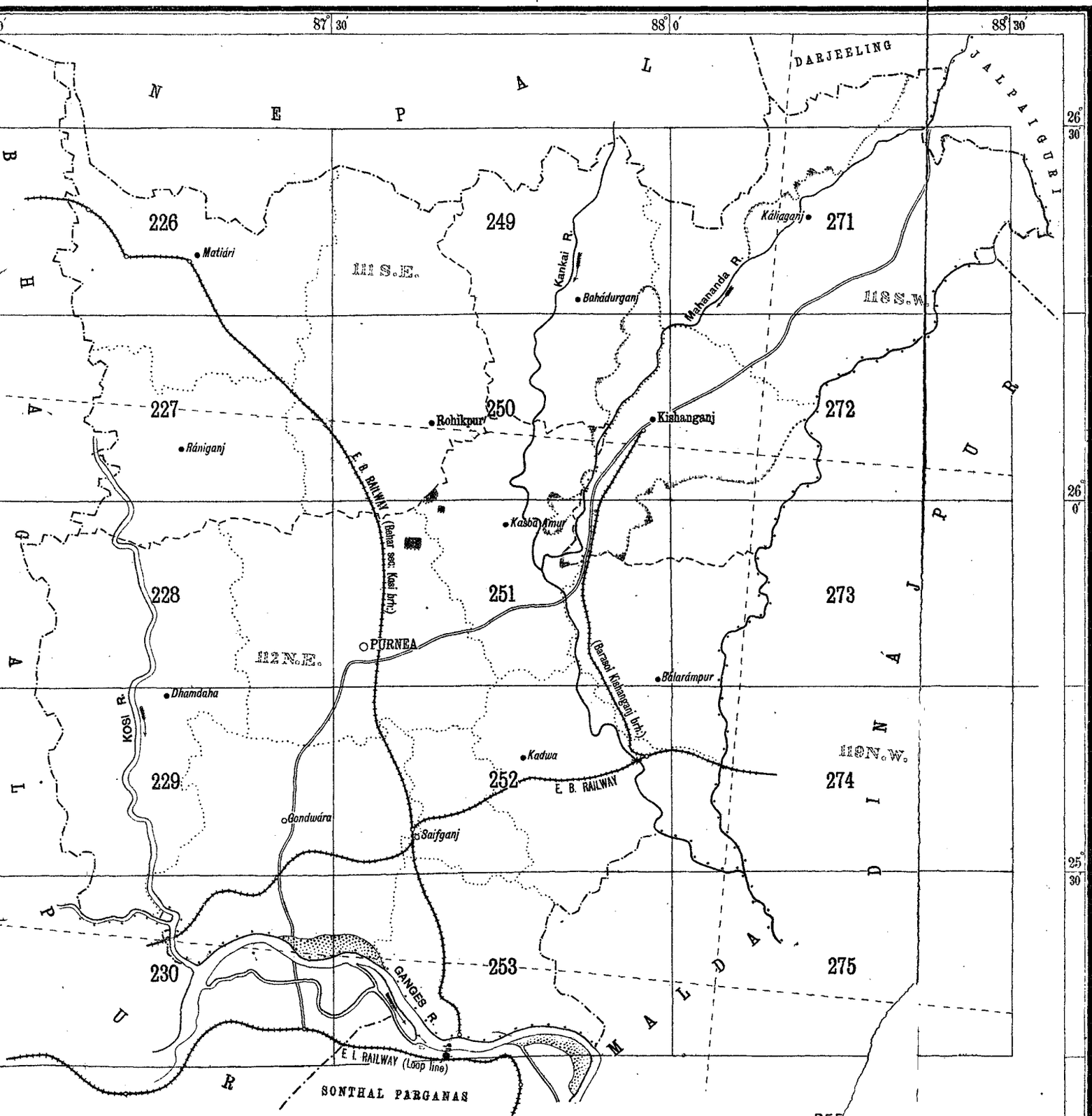
Traverse Survey.

13. Five scattered villages covering an area of 2 square miles which belong to the Surjapur pargana were traversed during the season under report.

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT PURNEA.

1901-02. No. 4 PARTY.



REF

Cadastrally Surveyed with season 1901-02

District Boundary

Sub-Division

Thana

NOTES.

The numerals **251**, &c., indicate the Standard sheets on the Scale 1 Inch = 1 Mile.

The figures and lines in strokes represent the numbers & limits of the Engraved sheets of the Indian Atlas.

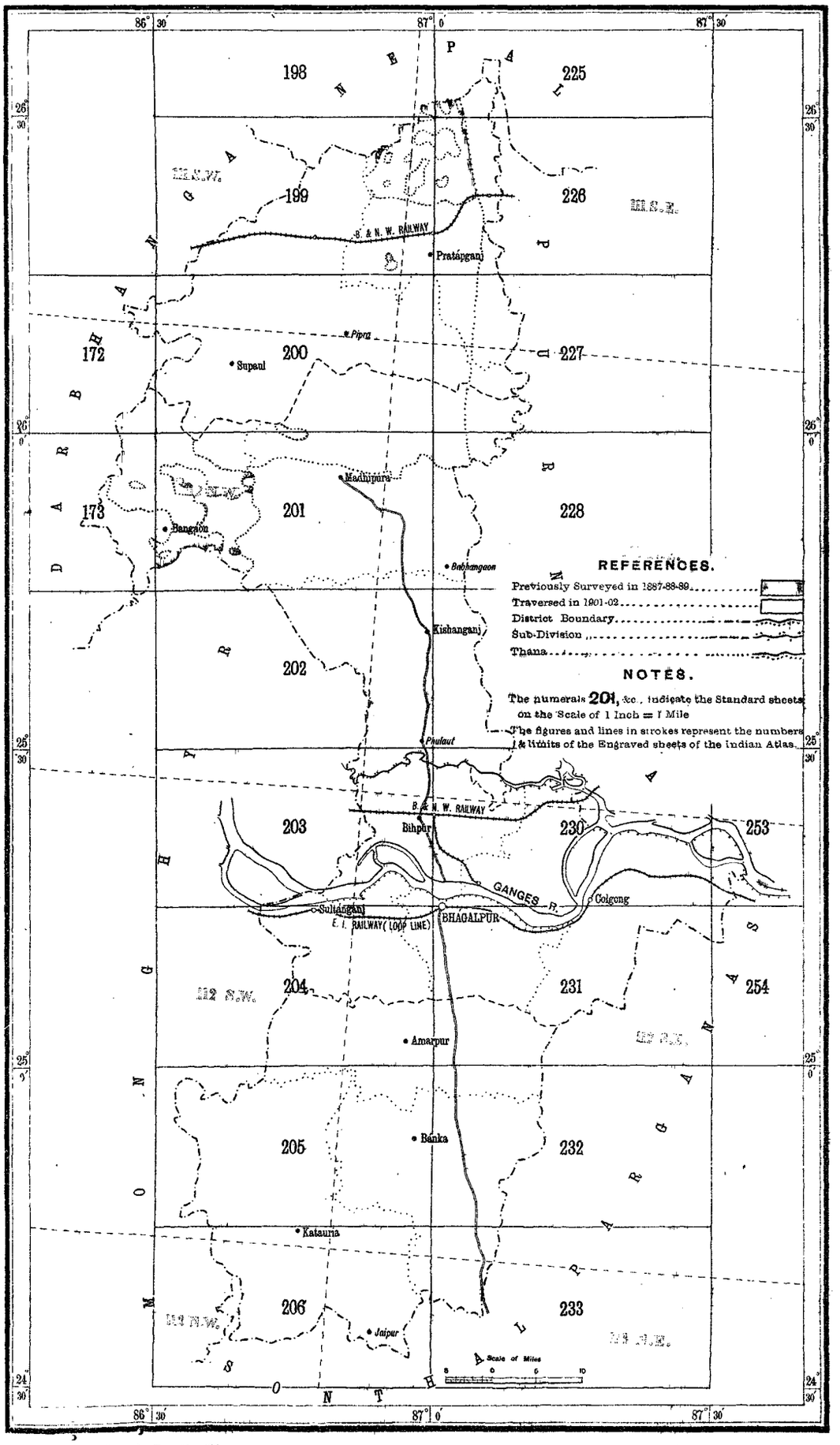
Photo. S. I. O., Calcutta.

Reg. No. 379, Bengal.—Dec. 02.—425.

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT BHAGALPUR.

1901-02. No. 4 PARTY.



Reg. No. 402 Bengal.—Dec. 02.—425.

Photo. S. I. O., Calcutta.

There are 63 theodolite stations in these villages and they have been marked by 12 stones, 49 cylinders and 2 pegs.

The expenditure was Rs. 47.

Cadastral Survey.

14. The cadastral survey with records of the Surjapur Pargana was undertaken by the cadastral camp under Mr. C. S. Kraal, which had completed its programme in Darbhanga.

The outturn accomplished, which represents the whole area of the pargana, was 735 villages, 728 square miles.

The survey has been checked by 3,354 linear miles of "partal," which gives an incidence of 4·6 linear miles to each square miles of detail survey.

The entries against 306,610 plots were checked by the survey staff, which gives an average of 31 per cent. on the total number of plots.

There were 202 boundary disputes, all of which have been decided. There were 13,427 disputes regarding entries in the records, all of which were decided except 1,404, which refer to the possession of trees, and these will be seen to at the attestation stage.

The demarcation for the traverse survey of the previous year which was supposed to be renewed by the inhabitants before the cadastral survey was found very defective.

The attendance afforded by the people was very indifferent, and their attitude generally to the survey operations passively hostile.

The tract under survey was very unhealthy, and the establishment has suffered very severely from malarial fever and dysentry. Excessive sickness was anticipated, and the strength of the establishment was nearly doubled before taking the field. It is fortunate this was done, as at no time during the season was more than half the establishment fit for work, and even the men at work were unable to give a full day's outturn. A large number of men absconded, and a considerable number out of those who had to be sent to their homes, have since died. The European staff have also suffered considerably. The entire season's work has been completed in every respect, and the records made over to the Settlement Department.

Owing to the fear that the people would remove such trijunction stones as had been embedded at the trijunctions of traverse lines and not at the true trijunctions of villages, it was found necessary to uproot them and place them at the true trijunctions marking their former positions with cylinders.

The expenditure on Cadastral survey with record-writing has been Rs. 1,37,364, which represents a rate of 188·7 per square mile.

Coolie labour was extremely difficult to obtain, and then only at double the North Bihar rates, and the pay of all the menial establishment had to be raised. Of the foregoing rate of Rs. 188·7 per square mile, Rs. 43 represent, the expenditure on labour alone.

DISTRICT BHAGALPUR.

Traverse Survey.

15. During the season under report the North Bihar traverse section immediately on completion of its programme in Monghyr commenced the traverse survey of the Bhagalpur District.

The area accomplished of 1,095 square miles comprises Thanas Pratapganj, Supaul, Bangaon, and half of Thana Madhipura, excluding the villages of the 1888-89 survey of the Srinagar-Baneli Raj.

The origin of survey adopted is the intersection of E. Long. 86° 50′ and N. Lat. 25° 50′ which will be suitable for the whole district north of the Ganges river.

There are 15,787 theodolite stations which have been marked by 1,676 stones, 13,639 cylinders, and 472 pegs.

The demarcation was very good indeed, mainly owing to the trouble taken and the interest exhibited by Mr. J. F. Shortt, the Sub-Manager of the Darbhanga Raj. Mr. Shortt had all the villages under his control carefully demarcated some months before the commencement of the survey

operations and his example was followed by the neighbouring zamindars. Eight station of the Great Trigonometrical Survey have been connected with. The angular work has been checked by the observation of 108 azimuths. The mean variation of the magnetic needle proved to be 1° 55′ east of the true meridian. The computations have all been completed, and the work has proved well. The usual tables of mathematical results are under submission to the Surveyor-General's office.

The health of the establishment in this District has been excellent.

The expenditure was Rs. 28,654, which gives a cost rate of Rs. 26·2 per square mile.

Topographical Survey.

16. Five villages, covering three square miles, which lie in the Ganges diara touching on Monghyr, have been surveyed topographically with a view to completion of the Monghyr *diara*. The accuracy of the survey was checked by 7 linear miles of test survey.

DISTRICT GAYA—DEO WARDS ESTATE.

Traverse Survey.

17. The programme of the North Bihar traverse section in this district consisted of the traverse survey of the scattered villages of the Deo Raj and Deo Rani's estates, and the provision plots for immediate Cadastral survey by the Settlement Department. The outturn accomplished comprises 90 villages with an area of 121 square miles.

There were 2,574 theodolite stations which have been marked by 327 stones, 1,766 cylinders, and 481 pegs. The mean magnetic variation deduced from the results of 25 azimuths is 1° 06′ east. As was to be expected the demarcation was bad. The Manager was unable to locate all his villages, and they had to be found by the Survey and Settlement staffs.

The expenditure was Rs. 4,701, which gives a cost rate of Rs. 39 per square mile. All the computations have been completed, and the work proves well.

DISTRICT BACKERGUNGE.

Traverse Survey.

18. The traverse survey operations in the district were in continuation of those of the previous year.

The total area traversed was 690 square miles, but of this 40 square miles have already been surveyed cadastrally by the Settlement Department, and the traverse survey thereof has only been undertaken in order to allow of the incorporation, after a topographical revision, of the reductions of the settlement maps on the standard sheet.

All the islands lying in the Bay of Bengal in the south east corner of the district have been traversed and connected, except 8, which are uninhabited and will be dealt with next season. There were 12,799 theodolite stations in the area traversed, and these have been marked by 685 stones, 11,885 cylinders, and 229 pegs. There are no Great Trigonometrical stations in the southern portion of the Backergunge district, so no connections are possible.

The angular work was checked by the observation of 68 azimuths, and the mean magnetic variation works out to 1° 30′ east.

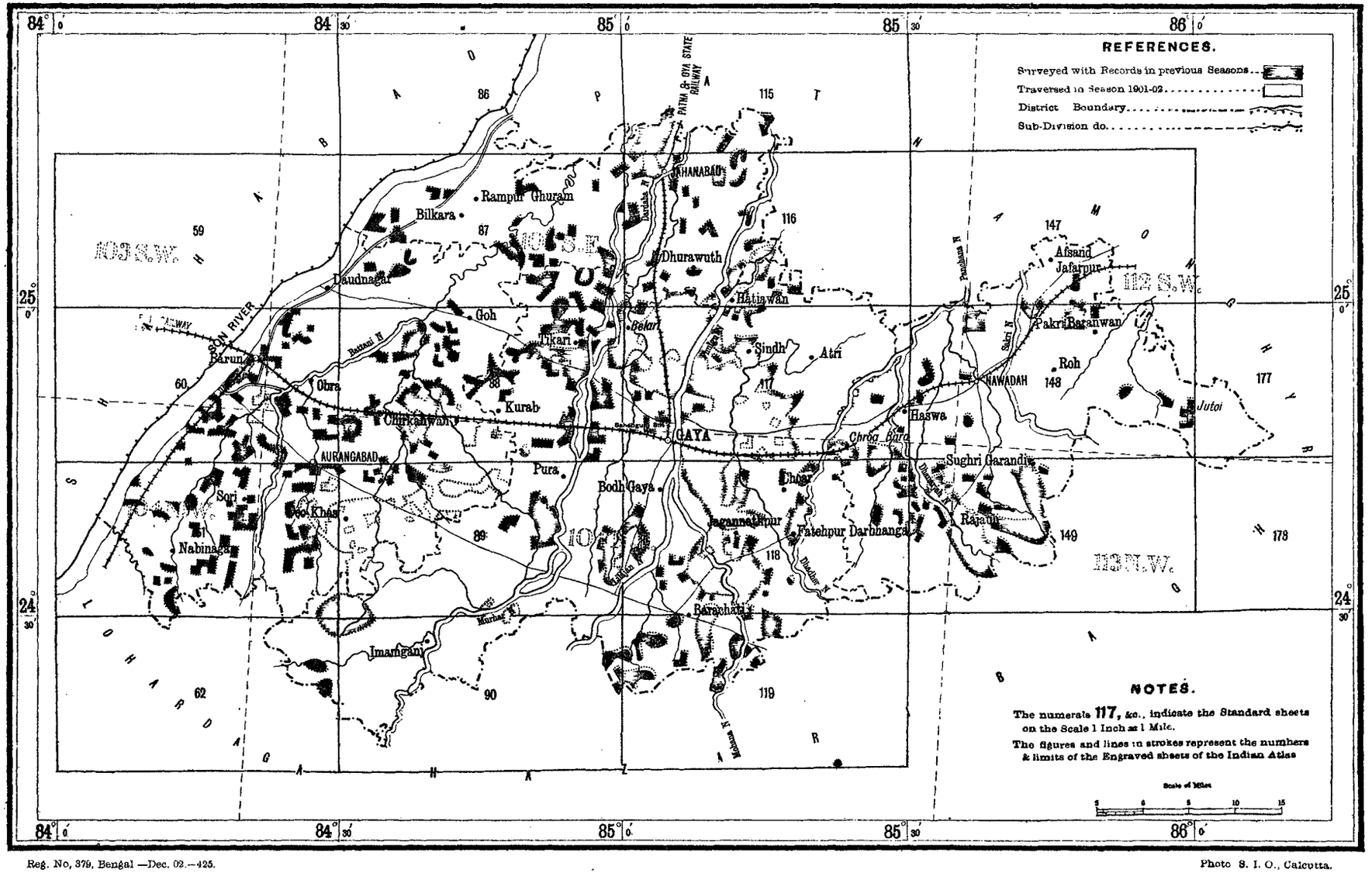
The demarcation was fairly good, but in some parts difficult to follow owing to excessive distances between the temporary demarcation marks.

The attitude of the inhabitants was simply apathetic. The difficulties owing to the nature of the country have been very considerable. The whole tract under survey is intersected by tidal rivers and narrow winding creeks, which made communication very difficult and necessitated the provision of a boat for nearly every sub-surveyor. Several of the islands in the Bay are reported to contain tigers and buffaloes, and it was with great difficulty that any men were induced to work in these islands. The progress of the work at the commencement of the

BENGAL SURVEY.

INDEX TO THE CADASTRAL & TRAVERSE SURVEYS IN DISTRICT GAYA.

1901-02. No. 4 PARTY



Reg. No, 379, Bengal —Dec. 02.—425.

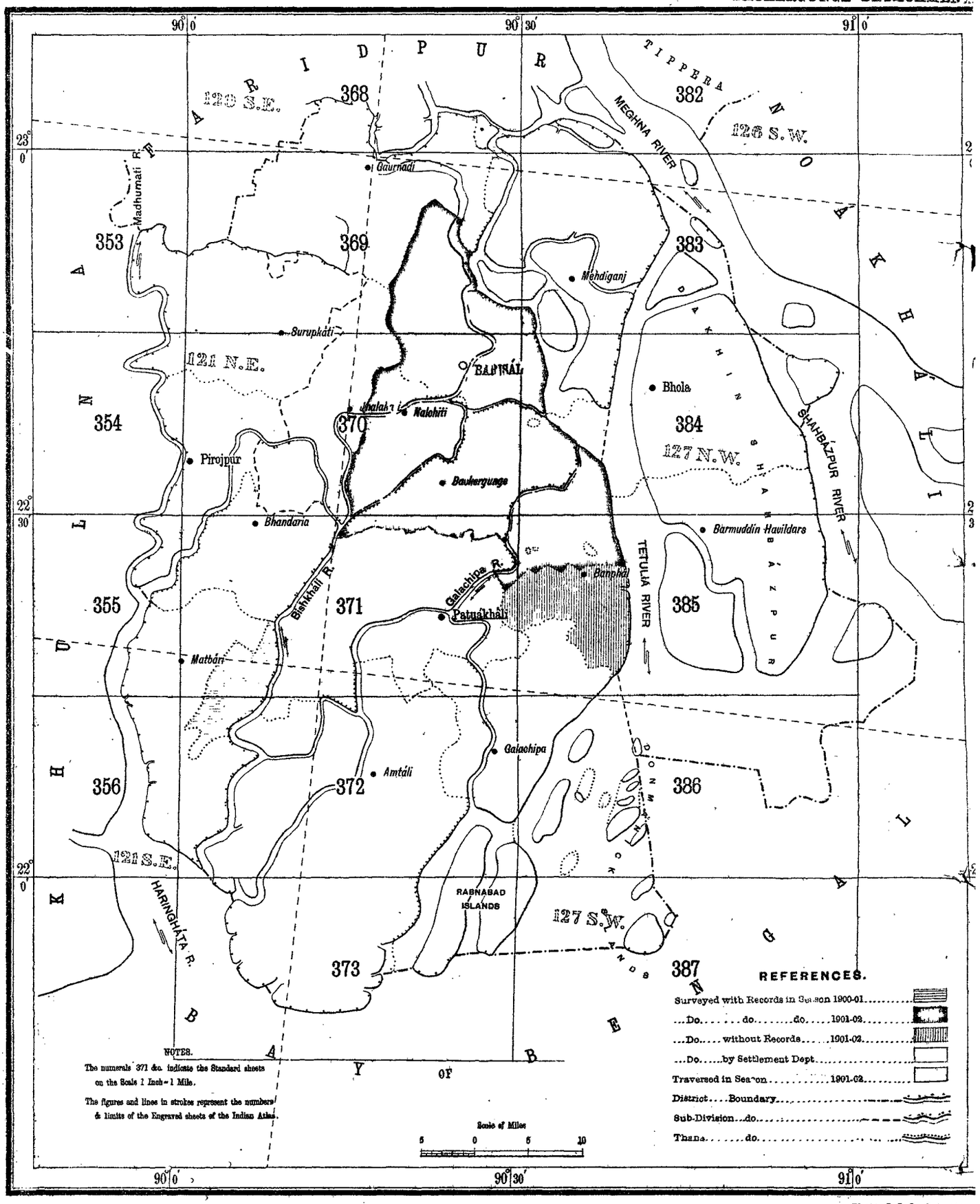
Photo S. I. O., Calcutta.

No. 1,C01-S 02.

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT BACKERGUNGE

1901-02. BACKERGUNGE DETACHMENT



NOTES.

The numerals 371 &c. indicate the Standard sheets on the Scale 1 Inch = 1 Mile.

The figures and lines in strokes represent the numbers & limits of the Engraved sheets of the Indian Atlas.

Scale of Miles

5 0 5 10

REFERENCES.

Surveyed with Records in Season 1900-01.....

...Do.....do.....do.....1901-02.....

...Do.....without Records.....1901-02.....

...Do.....by Settlement Dept.....

Traversed in Season.....1901-02.....

District....Boundary.....

Sub-Division...do.....

Thana.....do.....

Reg. No. 379. S. I.—Dec. 02.—425.

Photo. S. I. O., Calcutta.

No. 992-S. 02.

season was much retarded by the unusually late and heavy rains, and afterwards by squally weather in the Bay. The tents of the camp were destroyed in a cyclone on the 13th March, but fortunately the records were saved. The detachment has since been provided with portable zinc-roofed sheds. The expenditure was Rs. 42,726, which gives a cost rate of Rs. 61·9 per square mile. The reasons for this high cost rate are mostly apparent from the foregoing remarks as to the difficulties of the work, but it must also be remembered that all labour has to be imported and paid at high rates. All the computations have been completed, and the work proves well.

Cadastral Survey.

19. The programme of cadastral survey comprised the Backergunge, Bauphal, Nalchiti and Barisal thanas. The whole area of 569 square miles has been cadastrally surveyed, and 503 square miles have been completed in khanapuri. The area of 66 square miles which could not be completed in khanapuri lies in one compact block adjoining next season's, area, and will be dealt will in connection therewith.

The 16″=1 mile scale has been used throughout, except in a small area (about one square mile) around Barisal itself, which has been surveyed on the 32″ scale.

The survey has been tested by 2,514 linear miles of "partals," which gives an incidence of 4·4 linear miles of test survey to each square mile of detail.

The entries against of 116,065 plots have been tested by the survey staff. This represents 16 per cent. of the total number of plots. There were 81 boundary disputes, all of which have been decided, and 13,458 khanapuri disputes, all of which have been decided except 87. The expenditure was Rs. 1,60,741 and the cost rates for cadastral and records are Rs. 170-8 and Rs. 102-5 respectively.

These abnormally high rates are due to the very inferior material the establishment was composed of and to the heavy expenditure on cooly labour. The majority of the Bengali Inspectors and amins have proved to be very corrupt and lazy. Several Inspectors had to be summarily dismissed, and cases are pending against six others. The low rate of daily outturn of the amins has enormously increased the initial high cost of cooly labour. The average outturn per amin amounted to 250 acres a month. For this outturn the expenditure on his chainmen and coolies was Rs. 32 or Rs. 83 per square mile, which with additions for proportionate shares of supervision and control amounts, to approximately Rs. 101 per square mile.

The utilization of a purely Bengali agency had been insisted on, but the Board have now agreed to the introduction of a proportion of foreign Inspectors and amins, and a new system of contract payments on a sliding scale is about to be introduced, by means of which the amin himself will suffer if he does not give a fair outturn of work, and thus there will be a very marked reduction in cost rates for survey in future seasons, but as Bengalis must be used for the khanapuri, which in itself is very difficult, the saving under this head cannot be expected to be so much. A new and greatly abbreviated form of khasra has been approved, and a proposal to block the number of the plots lying within homestead lands has been sanctioned. This it is estimated will reduce the number of plots in a village by about 20 per cent., and thus savings will be possible.

The expenditure on providing boats for inspecting officers has been a very considerable items, and Rs. 12,000 had to be expended in providing the necessary office accommodation at Barisal by building zinc-roofed sheds. This last item has however been excluded from the cost rates of the year, as the sheds will be utilized by the Survey and Settlement Department for the next five years, and then more than half the cost will be recovered by sale of the materials. The progress of work was seriously hampered by the heavy rains at the commencement of the season, and the country remained under water for a long time.

Every effort was made by largely increasing the establishment and continuing field work into July to complete the "khanapuri" programme, but when it

was found that not more than about 500 square miles of khanapuri could be done, arrangements were made for locating the deficient area in one block and thus saving scattered work for the next season.

The attitude of the inhabitants was extremely apathetic. In only three villages, in one of which the map was destroyed and in the other two stolen but afterwards recovered, was any active hostility attempted.

About 400 *amins* and *muharrirs* were trained in the completion of records and compilation of statistics, and employed when the recess office opened. During August cholera broke out in Barisal and nearly half of the establishment absconded and did not return. This has caused arrears in the completion of the records, but arrangements have been made to deal with these arrears by a separate establishment, and the attestation programme will not be affected.

Sonthal Parganas District.

Traverse Survey.

20. The programme of the traverse survey detachment in this district, under Mr. C. S. Gasper, consisted of the traverse survey and preparation of plots for subsequent cadastral survey by the Settlement Department of private estates in the Deogarh subdivision and a small portion of the Jamtara subdivision; also of the traverse survey of a portion of Deogarh which had been previously surveyed by Mr. Craven. The object of this last mentioned item of work was to fix the true geographical values of the trijunction points so as to allow of the utilization of reductions (after a topographical revision survey has been carried out) of Mr. Craven's maps for the completion of the standard mapping of the district.

The areas accomplished are 788 square miles of ordinary *mauzawar* traversing and 243 of trijunction traversing.

There are 24,733 theodolite stations which have been marked by 3,477 stones and 21,256 pegs.

Three stations of the Great Trigonometrical Survey have been connected with.

In last season's report it was mentioned that an attempt would be made to connect previous season's work with the Great Trigonometrical series across the Ganges river. By means of triangulation and connecting lines a satisfactory connection has been made with Onali Great Trigonometrical Survey in district Malda, and all the traverse data have now been finally closed and inked up.

To check the angular work 198 azimuths have been observed. The mean variation of the magnetic needle is 1° 30′ east.

The preliminary demarcation carried out by the inhabitants themselves was very good. The health of the establishment has been excellent.

Last season it was found that owing to their proximity to their homes the Hazaribagh *khalasis* absconded on the smallest pretexts. In order to avoid this difficulty during the season under report, the khalasis were recruited from the United Provinces and worked steadily throughout.

The computations have all been completed in every respect and the work proves well. The expenditure was Rs. 34,549 on *mauzawar* traverse and Rs. 1,618 on trijunction traversing, which gives rates of Rs. 43·8 and Rs. 6·6 per square mile respectively.

District Singhbhum.

Traverse Survey.

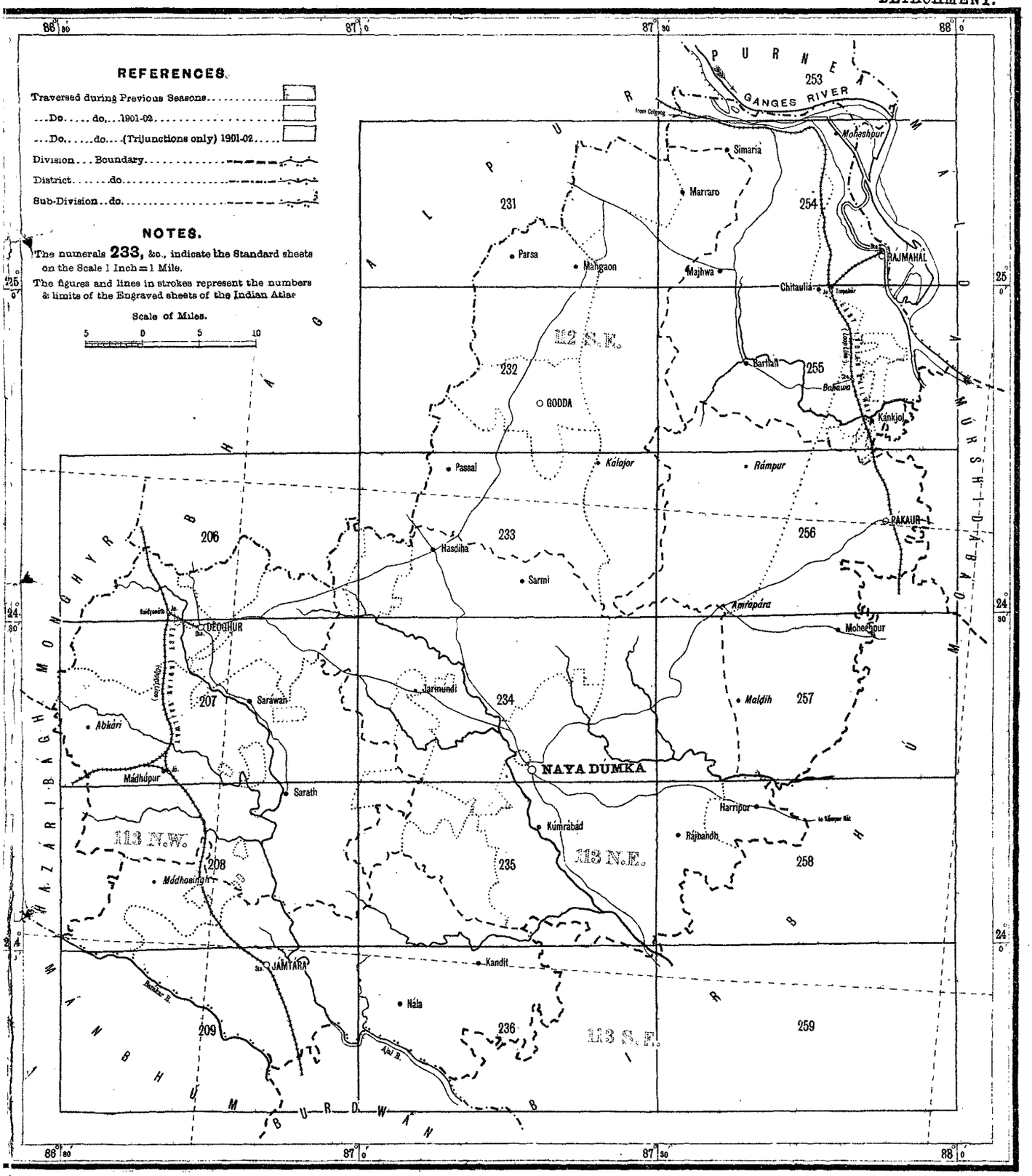
21. The programme of the detachment under Mr. T. W. Babonau in this district consisted of the completion of the traverse survey of the Porahat and Kera estates (about 100 square miles), and the traverse survey of the whole of Anandapur (about 160 square miles). The outturn accomplished amounted Rs. 298 square miles, viz. 22 of Kera, 54 Porahat, and 145 Anandapur. This completes the programmes in the Singhbhum district.

There were 9,153 theodolite stations which have all been marked by stones, except 665, which were marked by cylinders. The trijunction points are

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DIST. SONTHAL PARGANAS.

1901-02. DETACHMENT.



Reg. No. 379. S. I.—Dec. 02.—425.

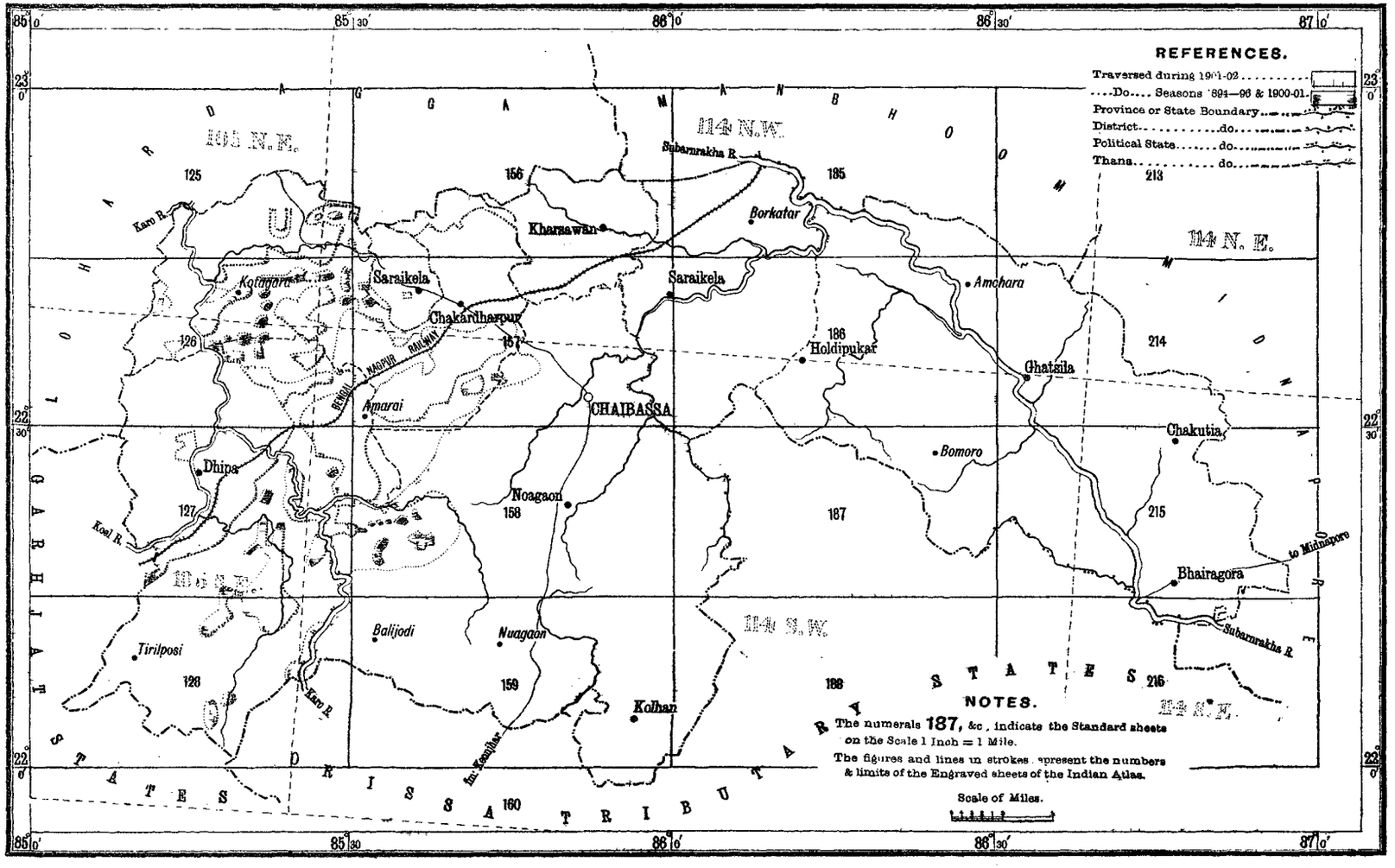
Photo. S. I. O., Calcutta.

No. 993-S. 02.

BENGAL SURVEY.

INDEX TO THE TRAVERSE SURVEY IN DISTRICT SINGHBHUM.

1901-02. CHOTA NAGPUR DETACHMENT.



Reg. No, 379, Bengal —Dec. 02.—425.

Photo. S. I. O., Calcutta.

No. 1,002-S 02.

BENGAL SURVEY.

INDEX TO THE TRAVERSE SURVEY IN DISTRICT RANCHI.

CHOTA NAGPUR DETACHMENT.

1901-02.

Photo. S. I. O., Calcutta.

Reg. No. 500, Bengal.—Dec. 02.—125.

distinguished by a triangle with a dot in centre cut on the stone, and the other stones are marked by a broad arrow. The angular work has been checked by the observation of 57 azimuths, and the variation of the magnetic needle is 1° 22′ east. Connections have been made to a number of triangulated points of the Chota Nagpur topographical survey of 1862-1865.

The preliminary demarcation was very good. The country traversed was hilly, and the use of the subtense bar for measuring the distances between traverse stations had to be freely resorted to.

The health of the establishment was very indifferent.

The expenditure was Rs. 9521, which gives a cost rate of Rs. 31·9 per square mile.

District Ranchi.

Traverse Survey.

22. The traverse detachment employed in the Singhbhum district moved into Ranchi to take up its programme of 460 square miles in the Khunti and and Tamar thanas. The area actually accomplished was 430 square miles.

The angular work was checked by the results of 93 observations for azimuth, and the mean variation of the magnetic needle proved to be 1° 22′ east.

Numerous connections with the topographical survey stations of 1862 have been made. The country traversed was very hilly (the hills averaging 2,000 feet) and necessitated the general use of the subtense bar instead of the chain.

There were 9,793 theodolite stations, all of which were marked by stones of the same pattern as used in Singhbhum. The demarcation was very good, and the attitude of the inhabitants all that could be desired.

The health of the establishment in this portion of the Ranchi district was very bad. Never more than half the establishment was fit for work at a time, and as practically every member of the establishment passed through the hospital two or three times, the outturn of work naturally suffered. A considerable number of men had to be invalided home and several have since died of malarial fever. It is reported however that this is the only really unhealthy portion of the district.

The cost has been Rs. 26,076 which gives a cost rate of Rs. 60·5 per square mile. This high cost rate is owing partly to the hilly nature of the country and partly to the excessive sickness of the establishment.

PART III.—REPORTS ON MISCELLANEOUS SURVEYS.

Malda District.

23. Under the orders of the Board the demarcation of certain Government Estates in the Malda district was undertaken with a view to the decision of boundary disputes with the neighbouring landlords and to check encroachments.

This work was undertaken by the Sonthal Parganas Detachment under Mr. C. S. Gasper. This work entailed the traversing of 12 villages covering an area of 36 square miles. Several trijunction points have been found to coincide with the old Revenue Survey trijunctions, and we have thus all the necessary data for redemarcation. One estate was redemarcated, but the permanent marking thereof and the redemarcation of the remaining estates will stand over until next field season. Mr. S. F. Norman was deputed to check the work of the native surveyor on the ground and reported the work as good, but was unable to complete his inspection owing to the rising of the river. The expenditure, which has been Rs. 610 up to date, is met partly by allotment from the Board and partly from the District Management Grant.

Champaran District.

24. At the request of the Collector of Champaran the old Revenue Survey boundary between mauzas Bairia Kalan and Mahadewa has been relaid in order to decide a dispute between the Bettiah and Ramnagar Rajs.

The work has been completed under the supervision of Mr. C. S. Gasper, and the expenditure is met by deposits.

Monghyr District.

Monghyr Fort.

25. Three estates, comprising the Monghyr Fort and its environs, have been surveyed under the orders of the Board.

The traverse survey was undertaken by Lieutenant F. C. Hirst, and the detail survey on the 64″ scale with records by Mr. A. W. Smart.

The 331 stations in the area traversed have all been marked by embedding bricks.

The detail survey has been checked by independent resurveys of portions of each sheet and also by 14 linear miles of test survey.

In the record of occupancy the entries against 426 plots have been tested.

A trace map on the 64″ scale, together with the original record of occupancy, have been made over to the Collector.

Monghyr.

Government Estates.

26. Under the orders of the Board 36 Government estates in the Monghyr district lying to the south of the southern high bank of the Ganges (and therefore out of the scope of the Government Notification of the general survey operations in this district) have been surveyed during the year under report.

The traverse survey of 26 of these estates was undertaken by the traverse section under Lieutenant Hirst, and the detail survey thereof, as well as of the remaining 10 (which were too small to require a traverse survey) was undertaken by Mr. A. W. Smart. These estate are all scattered and were very difficult to locate. The 335 theodolite stations necessary for this work have been marked by 44 stones, 271 cylinders, and 20 pegs. Owing to the scattered nature of the work, each estate has been plotted on its own magnetic bearing, and no attempt to connect one with another has been made. The detail survey which is contained in 49 sheets on the 16″ scale and one sheet on the 64″ scale, was checked by 59 linear miles of test survey or 5·30 linear miles of test survey to each square mile of detail. In the records the entries against 1,992 plots have been tested, which gives an average of 28 per cent. There were 4 boundary and 254 interior disputes, all of which have been decided by the Settlement Department.

Demarcation of boundary Mauza Harkar.

27. In order to definitely decide a boundary dispute between mauzas Harkar and Mathurapur, the Collector of Monghyr requested that the old revenue survey boundary be redemarcated.

The actual line of boundary to be relaid was only 2½ miles in length, but in order to obtain reliable points on which to base the work, the traverse survey of a block of villages covering 10 square miles was found necessary.

The work was undertaken by the traverse section under Lieutenant Hirst. There are 136 traverse stations, all of which were temporarily marked by pegs. All the records were handed over to the Collector on completion of the work to enable him to permanently mark the actual boundary.

The expenditure on this work has been met by deposits.

Shahabad District.

Hathwa Raj.

28. Two villages of the Hathwa Raj have been traversed to provide plots for the subsequent detail survey by the Settlement Department.

There are 67 theodolite stations which have been marked by 16 stones, 45 cylinders, and 6 pegs.

Dumraon Raj.

29. At the request of the Collector the traverse survey of the Taufir Bhedia Estate of the Dumraon Raj has been undertaken.

There are 137 theodolite stations which have been marked by 11 stones, 94 cylinders, and 32 pegs. The traverse plots were despatched to the Collector in April, and the expenditure is met by deposits.

Umarpur Diara.

30. The Collector of Shahabad requested that the old boundary lying in the Umarpur diara between the Shahabad and Ballia districts be redemarcated. The work was commenced on 4th April, but on the 25th was stopped, as the Collector reported that the Dumraon Raj refused to deposit funds. The Collector is arranging for the continuation of the work next season and for the provision of funds.

DARBHANGA DISTRICT.

31. The relaying of the boundary of Shah Alampur in the Ganges diara was undertaken at the request of the Settlement Officer of North Bihar. This work necessitated the traversing of three villages. There were 34 theodolite stations, all of which have been temporarily marked by pegs.

The expenditure is met by deposits from the parties concerned.

JALPAIGURI DISTRICT.

32. The work in this district consisted of the permanent marking of certain reference pillars (temporarily marked during the previous season) along the Baikantapur Estate boundary, and also the marking of 51 subsidiary points.

There are now 127 points marked by iron pillars and 34 by reference pillars. As all the preliminary traverse work had been completed during the previous season, the work of the season under report consisted of the erection of the iron pillars and of *pakha* reference pillars. It was found that the lines between pillars which had been cleared only the previous season had already closed up, and therefore had to be recut, and the opportunity was taken, wherever jungle exsisted, and the line between pillars would therefore be likely to be again grown over, to mark subsidiary points close to one of the main pillars as guide points to enable the line to be cleared in the direction of the next main pillar. These subsidiary guide points consist of stout stakes standing three feet above ground level and banked up with earth to within a foot of their tops. Lieutenant Hirst inspected the work in March and was satisfied with the work of the native sub-surveyor.

The plots and data have been submitted to the Collector and the expenditure is met by deposits.

PART IV.—REPORT ON THE BENGAL DRAWING OFFICE.

33. The work of the Bengal Drawing Office has been much increased during the year under report. The taking over of the reproduction of village maps by the Vandyke process from the Surveyor-General's Office and the increase to the standard mapping section necessitated the provision of more extensive accommodation. A suitable house has been rented in Free School Street, and the office opened there in April 1902. A dark room for the preparation of the zinc plates has been built, and all the necessary pipes and cisterns for an extra water-supply provided by the proprietors of the new office. Mr. W. H. Penrose has been in charge for the whole period, except for three months, when Babu Nilmoni Chatterji, Sub-Assistant Superintendent, officiated.

Exclusive of the general section, the work is carried out by five different sections.

The 2″ standard mapping section.

34. The reduction by pentagraph of the 16″ sheets of Orissa, Bihar, and Chittagong, and compilation of the 2″ quarter sections of the final 1″ standard maps comprises the present programme of this section. In Orissa there are 32 standard sheets, of which 7 had already been published. Of the remaining 25, all of which have been fair drawn, 20 have been corrected in accordance with the spelling of the village names in the thana lists and would

have been ready for publication but for the necessary revision of footnotes, &c., in accordance with recent orders of the Survey Department. All the sheets are however expected to be submitted for publication before the close of the current financial year.

In Bihar, comprising districts Saran, Champaran, Muzaffarpur and Darbhanga, there are 40 standard sheets. All the sheets of Muzaffarpur have been submitted for publication as a preliminary edition, but will have to be republished when completed up to margin and brought into final accord with the thana lists.

In district Saran and Champaran 8 standard sheets have been submitted for publication. Thus with the exception of 1 sheet and of Darbhanga all the standard sheets of North Bihar have now been sent to Press.

In Darbhanga all the sheets have been projected and 8 of them plotted. The transfer of reductions has been carried out in 3. As the Darbhanga sheets have now all been received, the 2″ mapping will be rapidly proceeded with.

During the year 2,269 cadastral sheets have been lodged in the drawing office, and this with the closing balance of last year of 548 sheet makes 2,817 sheets, of which 2,376 have been pentagraphed down to the 2″ scale during the year, and 1,469 have been transferred to the quarter sections.

The Chittagong mapping has been practically at a standstill, as the attempt to incorporate the material of the old survey of 1861 to 1866 in order to fill up the unsurveyed gaps has proved a failure. The Surveyor-General has now ordered the utilization of some later data, and the work is in progress and should be completed before close of the current financial year.

Bihar Badar Section.

35. During the year *badars* for 95 villages have been received and 92 have been dealt with.

The correction of village names and numbers to accord with the thana lists has been proceeded with and completed in 1,919 village area statements, in the traverse data of 3,465 villages, in the field-books of 3,032 villages, in the alphabetical list of 1,257 villages, and in the 16″ original maps of 2,092 villages.

Thana-mapping Section.

36. The thana maps are compiled from the proofs of the standard sheets, and the work of this section has been considerably retarded by the delays in publication of the standard maps which, as already explained, were unavoidable.

In Orissa out of 24 thanas, 9 have been completed to date, 2 having been compiled during the year under report.

In Bihar out of 29 thanas (exclusive of Darbhanga) 27 have been completed to date, 16 having been compiled during the year under report. The Darbhanga thana mapping will be proceeded with as soon as the standard sheets are ready.

The thana mapping of Chittagong (13 thanas) has been at a standstill for the reason given under the head of the standard mapping section.

This work will now, however, be taken in hand. Another reason for the delay in supply of thana maps has been on account of the return of the final proofs of the thana map from the Settlement Officers with about 50 per cent. of petty corrections in the spelling of village names, although the names were in accordance with the final lists received from the settlement. In consultation with the Director of Land Records and the Settlement Officers these petty corrections have been put a stop to.

The cost of publishing 100 copies of a thana map is at present about Rs. 120, but an experiment is in progress by which it is hoped to reproduce thana maps by the Vandyke process at a cost of Rs. 30 to Rs. 40 per 100 copies.

Reproduction of Village Maps.

37. The reproduction of village maps by the Vandyke process was taken over by the Bengal Drawing Office from the Surveyor-Generals office from the 17th July 1902 after receipt of the necessary plan fom England. The work

is comprised in three main processes, viz., (*a*) tracing by an establishment paid on contract and examination of traces by a fixed pay establishment (*b*) preparation of the zinc plate by the Vandyke process, (*c*) printing on to bank post paper 10 or more copies of each village map.

The sanctioned programme provides for the reproduction and supply of 10 copies of 19,000 sheets of Orissa, including Khurda, and 2,950 sheet of Chittagong. Up to date 12,638 sheets of Orissa and the whole 2,950 of Chittagong have been traced in the Bengal Drawing Office, out of which 6,419 of Orissa represent the outturn of the year under report. Of Orissa 12,338 sheets have been reproduced and 113,191 copies supplied to the Collectors of the Orissa districts. Of this amount of work the reproduction of 936 sheets with 10 copies of each and the despatch of 58,480 copies represents the outturn of work of the Bengal Drawing Office during the year.

In Chittagong 5 extra copies of 22 sheets have been prepared in the Bengal Drawing Office during the year and despatched to the Collector.

There thus only remains to complete the existing programme, the tracing of 6,362 sheets of Orissa, and the reproduction of 6,662 sheets, which amount of work at the present rate of progress does not provide a full programme for the next survey year. This matter has been reported to the Board separately.

Some mistakes were found in the printed copies of the Orissa sheets prepared in the Surveyor-General's office owing to the ignorance of Ooriya of the zinc plate corrector. This has necessitated the recall of one copy of each map from the Collector and the re-examination of the same.

Such mistakes cannot occur again, as the touching up of the zinc plates is strictly forbidden.

Orissa Badar Section.

38. The closing balance of last year was 157 villages and during the year under report 7 villages have been received. Of the total of 164 villages the "*badars*" of 144 have been dealt with during the year under report.

This section has also corrected the spelling of the village names and adjoining village names on 7,303 original 16″ sheets.

A comparison of the Orissa sheets with the finally attested settlement traces has been found necessary, as it was discovered that some *badars* of several seasons ago had not been carried out. Whether these *badars* had never been received from the Settlement Department, or whether the Bengal Drawing Office alone was to blame, it was impossible to discover, as the old form of registers did not give sufficient detail.

CHAPTER III.

PART I.—TOURS OF SUPERINTENDENT, PROVINCIAL SURVEYS.

39. I have been in the field and on tour for 231 days. I visited each section of the Bengal Surveys on an average of three times each during the field season, and again once each at their recess quarters during my monsoon tour.

PART II.—SERVICES OF OFFICERS.

40. Lieutenant F. C. Hirst has managed the Bihar Traverse Section with zeal and ability, and has accomplished a large and scattered programme with success. Lieutenant Hirst takes great interest in his work, and promises to be a very capable Revenue Survey Officer.

Mr. A. W. Smart has fully maintained his previous reputation, and by his able management of the Monghyr Cadastral Survey has worked at a very satisfactory cost rate.

Mr. C. S. Kraal has completed a large area of cadastral survey in Purnea, notwithstanding great difficulties on account of excessive sickness amongst his establishment, and deserves credit therefor.

Messrs N. Bedford and W. Skilling, in charge, respectively, of the Kalimpong and Backergunge Traverse Surveys, joined the Bengal Surveys during the year under report. They are both thoroughly capable cadastral officers and have done very good work.

Messrs. T. W. Babonau and C. S. Gasper, in charge, respectively, of the Chota Nagpur Traverse and Sonthal Parganas Traverse Surveys, have both done very good work.

Mr. W. H. Penrose, in charge of the Bengal Drawing Office, has worked satisfactorily.

Only one officer, viz., Mr. E. F. Berkeley, who was in charge for part of the year of the Backergunge Cadastral Survey, has failed to work to my satisfaction. As this officer has done very good work during previous years in the Bengal surveys, and his failure was attributable to a considerable extent to failure of health, he has, with the Surveyor-General's approval, only been punished by removal from charge.

All the sub-assistants, viz., Messrs. P. L. Causley, E. G. Hardinge, S. F. Norman, J. C. Lears, O. S. Hart, O. E. Judd, F. W. Marten, P. F. Delaney, P. Kennegy, and Babu Nilmoni Chatterji have all worked zealously and given satisfaction to the officers in charge of their sections.

The European Supervisors, viz., Messrs Le Franc, Fitzgibbon, Gomez, Newton, McDermot, and Monks have also all worked well.

Several members of the native establishments are deserving of special mention, and I will bring their services to the notice of the Board in a supplementary letter.

I have the honour to be,

SIR,

Your most obedient servant,

R. T. CRICHTON, MAJOR, I.S.C.,

Supdt., Provincial Surveys in Bengal.

APPENDIX I—PART A.

Summary of the outturn of work of the Survey Parties in Bengal for 1901-1902.

DISTRICT.	TRAVERSING.					CADASTRAL SURVEY.				RECORD-WRITING.		TOPOGRAPHICAL SURVEY.
	Number of villages.	Linear miles of chaining.	Number of stations at which the theodolite was set up.	Number of azimuths.	Number of sub-traverses.	Number of villages.	Fields.	Linear miles of test survey.	Number of sheets.	Number of villages.	Fields.	Number of villages.
1	2	3	4	5	6	7	8	9	10	11	12	13
Temporarily-settled and Government Estates.												
Darjeeling—Kalimpong Government Estate.	48	829	6,719	48	153	48	31,782	1,182	(a)220	48	31,782	...
Patna—Government Estates ...	52	307	2,023	...	...	...	...	...	...	...	...	...
Private Estates.												
Monghyr	148	797	4,077	20	218	332	4,74,703	(d)3,294	(b)1,003	336	4,80,619	55
Purnea	5	13	71	...	...	735	9,78,828	(d)3,354	(c)1,287	735	9,78,828	...
Bhagalpur	660	3,951	19,463	108	1,204	...	...	...	...	...	...	5
Gaya	90	497	2,637	25	149	...	...	...	...	...	...	...
Backergunge	390	2,004	13,678	68	493	748	7,80,553	(d)2,514	1,117	716	7,20,553	...
Sonthal Parganas—Mauzawar...	2,270	4,514	32,921	198	1,145	...	...	...	...	...	...	...
Ditto for trijunctions only.	679											
Singhbhum	220	926	9,153	57	326	...	...	...	...	...	...	...
Ranchi	294	1,395	9,793	93	467	...	...	...	...	...	...	...
Miscellaneous.												
Malda—Demarcation Government Estates.	12	70	242	5	...	...	...	...	...	...	...	...
Champaran—Demarcation of disputes.	1	1	10	...	...	...	...	...	...	...	...	...
Monghyr—Monghyr Fort ...	3	17	357	...	54	3	1,314	14	27	3	1,314	...
Ditto Government Estates	26	83	521	...	45	36	6,971	59	50	36	6,971	...
Ditto Demarcation Harkar-Mathrapur dispute.	2	24	136	...	5	...	...	...	...	...	...	...
Sahabad—Hathwa Raj villages	2	14	77	...	...	...	...	...	...	...	...	...
Ditto Demarcation Taufir-Bhedia dispute.	5	30	173	...	3	...	...	...	...	...	...	...
Sahabad—Demarcation Umarpur Deara.	1	22	70	...	...	...	...	...	...	...	...	...
Jalpaiguri—Baikantapur boundary.	...	97	...	...	...	...	...	...	...	...	...	...
Darbhanga—Demarcation Shah Alampur.	3	7	34	...	...	...	...	...	...	...	...	...
Total ...	4,911	16,598	102,145	622	4,267	1,902	22,74,151	10,417	3,704	1,874	22,20,067	60

(a) Includes 3 sheets on 64-inch scale.
(b) Ditto 169 ditto.
(c) Ditto 92 ditto.
(d) Exclusive of check surveys in village sites.

R T CRICHTON, MAJOR, I.S.C.,
Superintendent of Provincial Surveys in Bengal.

APPENDIX I—PART B.

Statement of Outturn and Cost-rates.

District and Estate.	Description of work.	Estimated total area to be dealt with in square miles.	Year of inception of operation.	Area surveyed in square miles.		Cost-rate per square mile.		Balance of area remaining to be surveyed (column 3—column 6).	Estimated cost of completing the area in column 9.	Estimated final cost rate per square mile.	Remarks. (Explanation of unusually high expenditure.)
				During the year under report.	Total including previous year.	During the year under report.	From beginning to end of the year under report.				
1	2	3	4	5	6	7	8	9	10	11	12
Government Estates.						Rs.	Rs.			Rs.	
Darjeeling-Kalimpong	Traverse	182	1901	182	182	61·2	61·2	Nil	Nil	61·2	Very hilly and difficult country.
	Cadastral	182	1901	182	182	163·8	163·8	Nil	Nil	163·8	Difficult country; cost of labour high.
	Record writing	182	1901	182	182						
Patna Government Estates	Traverse	47	1901	47	47	53·0	53·0	Nil	Nil	53·0	Small area and scattered work.
Private Estates.											
Monghyr	Traverse	1,485	1899	196	1,485	37·1	39·1			39·1	
	Cadastral	1,381	1900	640	1,381	68·1	71·7			71·7	
	Records	1,381	1900	652	1,381	53·3	57·6			57·6	
	Topographical ...	46	1900	20	46	17·3	16·3	Nil	Nil	16·3	
Purnea	Traverse	730	1900	2	730	23·5	38·3			38·3	
	Cadastral	728	1901	728	728	120·4	120·4			120·4	Extremely unhealthy tract of country and labour expensive.
	Records	728	1901	728	728	68·3	68·3			68·3	
Bhagalpur	Traverse	2,298	1901	1,095	1,095	26·2	26·2	1,203	31,800	26·0	
	Topographical ...	200	1901	3	3	17·0	17·0	197	3,350	17·0	
Gaya—Deo Ward's Estate	Traverse	121	1901	121	121	39·0	39·0	Nil	Nil	39·0	
Backergunge	Do.	2,400	1900	690	1,298	61·9	63·1	1,102	60,600	62·0	Indifferent local establishment and very high cost of imported labour.
	Cadastral	2,400	1900	569	602	170·8	183 9	1,798	1,79,800	124·0	
	Records	2,400	1900	503	536	102·5	109·9	1,864	1,11,900	75·3	
Sonthal Parganas Mauzawar	Traverse	3,811	1898	788	3,003	43·8	46·1	808	30,000	44·2	
Ditto Trijunction ...	Do.	1,551	1901	243	243	6·6	6·6	1,308	13,080	9·5	
Singhbhum	Do.	838	1900	298	338	31·9	47·4	Nil	Nil	47·4	
Ranchi	Do.	1,846	1901	431	431	60·5	60·5	1,415	63,700	48·6	Hilly and unhealthy tract of country.
Miscellaneous.											
Malda—Demarcation, Government Estates.	Traverse	36	1901	36	36	...	...			...	
Champaran—Dispute	Do.	...	1901	...	...	...	...			...	
	Do.	2	1901	2	2	162·5	162·5			162 5	Intricate traverse survey.
Monghyr—Monghyr Fort	Cadastral	2	1901	2	2	322 0	322·0			322·0	Do. detail survey on the 64-inch scale.
	Records	2	1901	2	2	168·5	168·5			168·5	
	Traverse	12	1901	12	12	33·5	33·5			33·5	
Do. Government Estates ...	Cadastral	11	1901	11	11	68·8	68·8	Nil	Nil	68·8	
	Records	11	1901	11	11	46·3	46·3			46·3	
Do. Demarcation of boundary dispute.	Traverse	10	1901	10	10	...	...			...	
Shahabad—Hathwa Raj	Do.	2	1901	2	2	...	...			...	
Do. Taufir Bhedia	Do.	4	1901	4	4	...	...			...	
Do. Umarpur Deara	Do.	8	1901	8	8	...	...			...	
Darbhanga—Shah Alumpur	Do.	4	1901	4	4	...	...			...	
Total and average columns 7, 8, and 11.	Traverse	15,387	...	4,171	9,556	39·9	43·2	5,831	19,680	41·8	
	Cadastral	4,704	...	2,132	2,906	122·3	126·5	1,798	1,79,800	111·5	
	Record-writing ...	4,704	...	2,078	2,840	64·5	67·4	1,864	1,11,900	58·8	
	Topographical ...	246	...	23	49	17·1	16·6	197	3,350	16·6	

R. T. CRICHTON, MAJOR, I.S.C.,

Superintendent of Provincial Surveys in Bengal.

APPENDIX II.

Statement showing the sums expended.

District, &c.	Description of work.	Expenditure incurred during the year under report.				Total expenditure from inception to end of the year under report.			
		Actual (direct) cost.	Share of Superintendent, Provincial Surveys, pay and cost of his office.	Four per cent. for instruments.	Total.	Actual (direct) cost.	Share of Superintendent, Provincial Surveys, pay and cost of his office.	Four per cent. for instruments.	Total.
1	2	3	4	5	6	7	8	9	10
Government Estates.		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Darjeeling—Kalimpong	Traverse	10,504	642	...	11,146	10,504	642	...	11,146
	Cadastral	27,014	1,650	1,147	29,811	27,014	1,650	1,147	29,811
	Records	...	...	...	...	...	...	...	...
Patna—Government Estates	Traverse	2,259	138	96	2,493	2,259	138	96	2,493
Private Estates.									
Monghyr	Traverse	6,600	403	280	7,283	51,541	6,275	2,272	60,088
	Cadastral	39,510	2,413	1,677	43,600	88,614	6,567	3,807	98,988
	Records	31,386	1,917	1,332	34,635	71,146	5,281	3,057	79,484
	Topographical ...	315	18	13	346	674	48	29	751
Purnea	Traverse	42	3	2	47	24,809	2,098	1,076	27,983
	Cadastral	79,410	4,850	3,370	87,630	79,410	4,850	3,370	87,630
	Records	45,068	2,753	1,913	49,734	45,068	2,753	1,913	49,734
Bhagalpur	Traverse	25,966	1,586	1,102	28,654	25,966	1,586	1,102	28,654
	Topographical ...	47	2	2	51	47	2	2	51
Gaya—Deo Ward's Estate	Traverse	4,430	271	...	4,701	4,430	271	...	4,701
Backergunge	Do.	38,719	2,364	1,643	42,726	79,256	5,793	3,401	88,450
	Cadastral	98,940	6,043	4,199	1,09,182	1,05,634	6,609	4,489	1,16,732
	Records	46,722	2,854	1,983	51,559	53,162	3,399	2,263	58,824
Sonthal Parganas—Mauzawar ...	Traverse	32,560	1,989	...	34,549	1,21,416	13,154	4,039	1,38,609
Ditto Trijunction ...	Do.	1,525	93	...	1,618	1,525	93	...	1,618
Singhbhum	Do.	8,973	548	...	9,521	36,791	2,901	...	39,692
Ranchi	Do.	23,630	1,443	1,003	26,076	23,630	1,443	1,003	26,076
Miscellaneous.									
Malda—Demarcation	Traverse	553	33	24	610	553	33	24	610
Champaran—Dispute	Do.	94	6	4	104	94	6	4	104
	Do.	295	18	12	325	295	18	12	325
Monghyr—Monghyr Fort	Cadastral	583	36	25	644	583	36	25	644
	Records	305	19	13	337	305	19	13	337
Monghyr—Southern Government Estates.	Traverse	365	22	15	402	365	22	15	402
	Cadastral	686	42	29	757	686	42	29	757
	Records	463	28	19	510	463	28	19	510
Monghyr—Harkar Matrapur Dispute	Traverse	353	22	15	390	353	22	15	390
Shahabad—Hathwa Raj village ...	Do.	282	17	12	311	282	17	12	311
Do. Taufir Bhedia	Do.	144	9	6	159	144	9	6	159
Do. Umarpur Diara	Do.	263	16	11	290	263	16	11	290
Jalpaiguri—Baikantapur	Do.	1,384	84	59	1,527	5,166	404	223	5,793
Champaran—Arrears	Topographical ...	184	11	...	195	184	11	...	195
Darbhanga—Badar Establishment ...	Cadastral	1,766	107	75	1,948	1,766	107	75	1,948
Ditto Arrears	Do.	6,823	418	290	7,531	6,823	418	290	7,531
Ditto Shah Alampur	Traverse	157	10	7	174	157	10	7	174
Sonthal Parganas—Damin-i-koh ...	Do.	573	35	...	608	573	35	...	608
Monghyr—Badar Establishment ...	Cadastral	2,137	132	92	2,361	2,137	132	92	2,361
Do. Arrears	Do.	814	50	34	898	814	50	34	898
Purnea—Kissenganj Municipality ...	Do.	40	2	2	44	40	2	2	44
Traming Kumar Palden	Traverse	13	1	1	15	60	11	3	74
Total ...	Traverse	1,59,684	9,753	4,292	1,73,729	3,90,432	34,997	13,321	4,38,750
	Cadastral	2,57,723	15,743	10,940	2,84,406	3,13,521	20,463	13,360	3,47,344
	Records	1,23,944	7,571	5,260	1,36,775	1,70,144	11,480	7,265	1,88,889
	Topographical ...	546	31	15	592	905	61	31	997
Bengal Drawing Office	Standard maps ...	8,764	536	...	9,300	14,859	1,052	...	15,911*
	Thana maps ...	592	36	...	628	1,322	98	...	1,420*
	Reproduction of village maps.	29,963	1,830	...	31,793	54,960	3,945	...	58,905*
	Orissa Badars ...	783	48	...	831	4,083	327	...	4,410*
	Bihar Badars ...	1,985	121	...	2,106	3,062	212	...	3,274*
Grand Total ...		5,83,984	35,669	20,507	6,40,160	9,53,288	72,635	33,977	10,59,900

* Figures from 1900 only, when the Bengal Drawing Office became part of the Bengal Surveys.

R. T. Crichton, Major, I.S.C.,
Superintendent of Provincial Surveys, Bengal.

B. S. Press—3093J—425—20 12-1902—W. H. S.

REVENUE DEPARTMENT.

LAND REVENUE.

CALCUTTA, THE 19TH MARCH, 1903.

RESOLUTION—No. 1495.

READ—

Letter No. 467A., dated the 21st January 1903, from the Board of Revenue, submitting, with a note, the Survey and Settlement Reports for the year ending 30th September, 1902.

THE Survey and Settlement Reports for the year ending 30th September, 1902, with their appendices, have been prepared in accordance with the orders of Government, and deal concisely with all the points on which information is needed. As required in Government order No. 1820T.—R., dated the 9th September, 1902, the subject of the maintenance of boundary marks will be included in future Settlement Reports.

2. Excluding minor operations, survey work under the Superintendent of Provincial Surveys was carried on during the year in ten districts, contained in five Divisions, and settlement operations under the Director of Land Records in twelve districts, situated in six Divisions.

3. The survey programme was much larger than in the previous year. It was, with but few exceptions, fully carried out, notwithstanding considerable difficulties. The area covered by the traverse survey parties was 4,171 square miles, while 43·52 square miles were topographically surveyed. Cadastral survey operations extended over 3,357 square miles, while initial records were written up for 3,303 square miles. A record-of-rights has now been completed, in settlements under the control of the Director of Land Records, for 29,610 square miles, or about one-fifth of the British territory of the Province. The programme of the Settlement Department could not be completed in the zamindari estates in the Sonthal Parganas, in the Munda country in Ranchi, in the Porahat estate in Singhbhum, and in the Hathwa Raj villages in Shahabad: there were also small deficiencies in Noakhali and Backergunge, and in the Maqsudpur and Deo estates in Gaya. In all these cases, however, the reasons given for the failures are satisfactory.

4. The high cost of survey and settlement proceedings in Bengal has lately been the subject of much discussion. After full and careful enquiry it has been found that the conditions under which operations are carried on in the Central Provinces, the United Provinces of Agra and Oudh, and Bengal are so different that no comparison can fairly be made between the rates of cost in the several Provinces. Some reduction in the cost of supervision will be effected by increasing the area dealt with by a traverse party from 1,200 to 1,600 square miles, and the area dealt with by a cadastral camp from 600 to 800 square miles. Other reforms which will further reduce expenditure are the curtailment of the number of survey plots of fields, the abbreviation of the khasra, and the survey of village sites on the scale of 16″ to a mile, instead of, as heretofore, on one of 64″ to a mile, which are mentioned in paragraphs 9 and 10 of the Settlement Report and paragraph 5 of the Survey Report. The standard rates per square mile, as worked out by the Survey and Settlement Departments will, in future, be—

Survey.

	Rs.
Traverse survey	40
Cadastral and record-writing	153
Total ...	193 per sq. mile.

Settlement.

	Rs.
Supervision of initial record-writing	21
Attestation and draft publication	50
Disposal of objections under section 103A of the Tenancy Act	17
Office work and final publication	33
Case-work under sections 105 and 106 of the Tenancy Act	30
Contingencies	25
Computation and recovery	11
Supervision	40
Total ...	227
GRAND TOTAL ...	420 per sq. mile.

5. The Lieutenant-Governor observes with pleasure that in North Monghyr the cost of cadastral survey and record-writing was only Rs. 121·4 per square mile. This, as the Superintendent of Provincial Surveys observes, is the lowest rate reached so far in conducting surveys in Bengal. In Kalimpong, Purnea, Backergunge and Ranchi the cost-rates of survey work were high, but the explanations given are satisfactory. In Maqsudpur the cost of attestation and draft publication was Rs. 70-8-4 per square mile, but the extremely strained relations existing between the landlord and his tenants afford a sufficient explanation of the high cost. In Backergunge the cost of supervision of initial record-writing was high, but this is accounted for by the extreme subinfeudation of rights in that district, an interesting example of which is given by the Director of Land Records in paragraph 67 of his Report.

6. The Lieutenant-Governor notices with satisfaction the remarks made by the Superintendent of Surveys, in paragragh 15 of his Report, as regards the assistance afforded him in demarcation work in Bhagalpur by Mr. J. F. Shortt, the Sub-Manager of the Darbhanga Raj. He is also pleased to observe that the good example set by the Raj was followed by neighbouring zamindars.

7. The question of undertaking a fresh survey of the Brahmaputra-Ganges *diaras*, referred to in paragraph 11 of the Director's Report, is now engaging the attention of the Board, and a report on the subject will, it is understood, be shortly submitted by them to Government.

8. The question referred to in paragraph 70 of the Settlement Report, as to whether the Sundarbans portion of Backergunge should be excluded from the survey and record-of-rights now in progress in that district, is still under the consideration of Government.

9. His Honour notices with satisfaction the marked success attending the recovery of costs in Darbhanga. As observed by the Director of Land Records in paragraph 101 of his Report, the fact that the raiyats voluntarily paid up considerably over 99 per cent. of the sums due by them is a striking proof of the value which they attach to the record.

10. In paragraphs 24 to 27 of the Settlement Report, the Director notices the system for settling of rents in the Damin-i-koh Government estate in the Sonthal Parganas. In orders No. 204T.—R., dated the 6th November 1901, Government laid particular stress on the necessity of seeing that the raiyats should receive the full benefit, during the term of the ensuing settlement, of all improvements made by them in their lands. If, for example, the Settlement Officer found that any of the first class embanked rice lands fell into that category in virtue of special exertions on the part of the raiyats, the instructions were that he should assess such lands at second class and not at first class rates. Government also approved the Settlement Officer's proposal that enhancements on the rental assessed at the last settlement should be limited to 50 per cent. for the first five years, and to 75 per cent. for the remainder of the settlement. The present Report shows that it was found to be impossible to carry out the first part of these orders literally, because the records of the last settlement did not enable the history of particular fields to be traced from that settlement. As pointed out, however, by the Director, the Settlement Officer acted up to the spirit of the orders referred to, the total rental actually assessed falling considerably short of the amount which a strict application of the sanctioned rates would have warranted.

11. The subject of the maintenance of land records has for the first time been dealt with in the present Settlement Report. The mutation offices, established under the Land Records Maintenance Act, III (B.C.) of 1895, remained open during the year, but the working of them did not afford any ground for disputing the conclusion already arrived at that the Act has proved a failure. A scheme for the maintenance of the records in North Bihar has been submitted to the Government of India; a similar scheme for Chittagong is under the consideration of this Government; while another for Orissa will shortly be submitted to Government by the Board.

12. In Government and Wards' estates returns of mutations have been furnished in respect of a few more estates than in the previous year, but it seems that in several instances the standing orders as regards the registration of names are either neglected or are not fully understood. The Board are requested to take steps to secure a fuller compliance with the rules in future.

13. The Board intend to consider the advisability of issuing a circular with reference to the suggestions made in paragraph 196 of the Settlement Report as regards the utilisation of settlement records in the work of general administration. Government desire to be informed of the action that may ultimately be taken by them in this matter.

14. The thanks of the Lieutenant-Governor are due to Messrs. Lyon and Allen and to Major Crichton for their capable supervision of the Departments entrusted to them. His Honour is also glad to observe that a large number of Survey and Settlement officers have been commended by their superiors. The able manner in which Messrs. Kerr and Beatson-Bell have controlled the large staffs working under them and have surmounted the difficulties met with is particularly noticeable. It is understood that Mr. Kerr will leave the Settlement Department at an early date after eight years' connection with it, and therefore His Honour desires to place on record his high appreciation of the excellent work done by Mr. Kerr throughout that period.

ORDER.—Ordered that this Resolution be published in the *Calcutta Gazette*, and that copies of it, with copies of the two Reports, be submitted to the Government of India.

By order of the Lieutenant-Governor of Bengal,

A. EARLE,

Offg. Secretary to the Govt. of Bengal.

No. 1496.

COPY, with a copy of the Survey Report, forwarded to the Deputy Surveyor-General in charge, Revenue Branch, Survey of India, for information

---

No. 1497.

COPY, with a copy of the Settlement Report, forwarded to the Appointment Department of this Government for information with special reference to paragraph 14 above.

No. 1498.

COPY forwarded to the Secretary to the Board of Revenue, Land Revenue Department, for the information of the Board.

By order of the Lieutenant-Governor of Bengal,

W. R. GOURLAY,

Offg. Under-Secretary to the Govt. of Bengal.

CALCUTTA,
The 19th March 1903.

B. S. Press—7496C—1,041—19-3-1903—C. G. S.

ANNUAL REPORT

EDITED

ON THE

SURVEY OPERATIONS IN BENGAL.

DURING THE YEAR

1902-1903.

From 1st October 1902 to 30th September 1903.

Calcutta:
PRINTED AT THE BENGAL SECRETARIAT PRESS.
1904.

Published at the BENGAL SECRETARIAT BOOK DEPÔT,
Writers' Buildings, Calcutta.

OFFICIAL AGENTS.

In India—

MESSRS. THACKER, SPINK & Co., Calcutta and Simla.
MESSRS. NEWMAN & Co., Calcutta.
MESSRS. HIGGINBOTHAM & Co., Madras.
MESSRS. THACKER & Co., LD., Bombay.
MESSRS. A. J. COMBRIDGE & Co., Bombay.
THE SUPERINTENDENT, AMERICAN BAPTIST MISSION PRESS, Rangoon.
MRS. RADHABAI ATMARAM SAGOON, Bombay.
MESSRS. R. CAMBRAY & Co., Calcutta.
MESSRS. S. K. LAHIRI & Co., Printers and Booksellers, College Street, Calcutta.
RAI SAHIB M. GULAB SINGH & SONS, Proprietors of the Mufid-i-am Press, Lahore, Punjab.
MESSRS. V. KALYANARAMA IYER & Co., Booksellers, &c., Madras.
MESSRS. D. B. TARAPOREVALA, SONS & Co., Booksellers, Bombay.
MESSRS. G. A. NATESON & Co., Madras.
MESSRS. A. W. HAMILTON & Co., 11 Edmondstone Road, Allahabad.
MR. N. B. MATHUR, Superintendent, Nazair Kanum Hind Press, Allahabad.
THE CALCUTTA SCHOOL BOOK SOCIETY.

In England—

MR. E. A. ARNOLD, 37 Bedford Street, Strand, London.
MESSRS. CONSTABLE & Co., 2 Whitehall Gardens, London.
MESSRS. SAMPSON LOW, MARSTON & Co., St. Dunstan's House, Fetter Lane, London.
MESSRS. LUZAC & Co., 46 Great Russell Street, London.
MESSRS. KEGAN PAUL, TRENCH, TRÜBNER & Co., *Charing Cross Road, London.*
MR. B. ALFRED QUARITCH, 15 Piccadilly, London.
MESSRS. P. S. KING & SON, 2 & 4 Great Smith Street, Westminster, London.
MESSRS. H. S. KING & Co., 65 Cornhill, London.
MESSRS. WILLIAMS AND NORGATE, Oxford.
MESSRS. DEIGHTON BELL & Co., Cambridge.

On the Continent—

MESSRS. R. FRIEDLÄNDER & SOHN, Berlin, N. W., Carlstrasse, 11.
MR. OTTO HARRASSOWITZ, Leipzig.
MR. KARL HIERSEMANN, Leipzig.
MR. ERNEST LEROUX, *28 Rue Bonaparte, Paris.*
MR. MARTINUS NIJHOFF, The Hague.

[Maximum limit, pages 20.]

INDEX TO CONTENTS.

CHAPTER I.

PAGE.

GENERAL REMARKS ON THE PROVINCIAL SURVEYS 1

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND RECORDS OF RIGHTS IN TEMPORARILY-SETTLED AND GOVERNMENT ESTATES UNDER SETTLEMENT OF RENTS AND LAND REVENUE.

CHOTA NAGPUR DIVISION · HAZARIBAGH DISTRICT—KODERMA ESTATE . 2

BHAGALPUR DIVISION · MONGHYR DISTRICT—GOVERNMENT ESTATES . 3

PART II.—REPORTS ON SURVEYS AND RECORDS OF RIGHTS IN PRIVATE ESTATES.

BHAGALPUR DIVISION — BHAGALPUR DISTRICT—TRAVERSE SURVEY . . . 3

BHAGALPUR DIVISION — „ „ CADASTRAL „ . . . 3

BHAGALPUR DIVISION — PURNEA „ TRAVERSE „ . . . 4

RAJSHAHI „ . RANGPUR „ TRAVERSE „ . . . 5

DACCA „ . BACKERGUNGE „ TRAVERSE „ . . . 5

DACCA „ . „ „ CADASTRAL „ . . . 6

BURDWAN „ . MIDNAPORE „ TRAVERSE „ . . . 6

BHAGALPUR „ · SONTHAL PARGANAS „ „ . . 7

CHOTA NAGPUR „ . RANCHI DISTRICT „ „ . . . 7

CHOTA NAGPUR „ . RANCHI DISTRICT CADASTRAL „ . . . 8

PART III.—REPORTS ON MISCELLANEOUS SURVEYS.

BHAGALPUR DIVISION—BHAGALPUR DISTRICT—BHAGALPUR MUNICIPALITY . . 8

PATNA „ DARBHANGA „ ROSERA „ . . . 9

BHAGALPUR „ MONGHYR „ MAUZA DAROBUST . . . 9

PATNA „ SHAHABAD „ TAUFIR BHEDIA 9

PATNA „ „ „ SURAJPURA ESTATE 9

PATNA „ „ „ UMARPUR DIARA 10

BHAGALPUR „ PURNEA „ MATIARI THANA 10

PRESIDENCY „ 24-PARGANAS—CALCUTTA SUBURBS SURVEY 10

PART IV.—REPORT ON THE BENGAL DRAWING OFFICE.

STANDARD AND DISTRICT MAPPING SECTION 11

THANA MAPPING SECTION 12

REPRODUCTION OF VILLAGE MAPS 12

BIHAR BADAR SECTION 13

ORISSA BADAR „ 13

CHAPTER III.

	Page.
PART I.—TOURS OF THE SUPERINTENDENT OF PROVINCIAL SURVEYS	13
PART II.—SERVICES OF OFFICERS	13

LIST OF APPENDICES.

APPENDIX I.—PART A.—SUMMARY OF OUTTURN OF WORK		15
	PART B.—STATEMENT OF OUTTURN AND COST RATES	16
„ *II.*—EXPENDITURE STATEMENT		17

LIST OF INDEX MAPS.

PROVINCE OF BENGAL	*To face page*		1
HAZARIBAGH DISTRICT	„	„	2
BHAGALPUR „	„	„	3
PURNEA „	„	„	4
RANGPUR „	„	„	5
BACKERGUNGE „	„	„	5
MIDNAPORE „	„	„	6
SONTHAL PARGANAS „	„	„	7
RANCHI „	„	„	8

ANNUAL REPORT

OF

THE SUPERINTENDENT OF PROVINCIAL SURVEYS, BENGAL

ON THE

SURVEY AND RECORD-OF-RIGHTS OPERATIONS IN BENGAL

DURING THE YEAR 1902-1903.

No. $\frac{5022}{R\text{-}7—95}$.

FROM MAJOR R. T. CRICHTON, I.A.,

Superintendent of Provincial Surveys in Bengal,

TO THE SECRETARY TO THE BOARD OF REVENUE, L. P.

Dated Dinapore, the 7th December 1903.

SIR,

I HAVE the honour to submit the report on the Survey operations in Bengal during the past survey year, namely, from 1st October 1902 to 30th September 1903.

2. I have been in charge for the whole period under report except from 7th August till 30th September, during which period I was at home on privilege leave, and Lieutenant F. C. Hirst, I.A., officiated for me.

CHAPTER I.

GENERAL REMARKS.

3. The outturn of the year, namely, 6,884 square miles traverse, 2,838 square miles cadastral, and 2,620 square miles, of record-writing, is comprised in major operations in six districts and 11 minor surveys. The outturn accomplished in each of these operations is fully up to the programme, except for a failure in the Ranchi cadastral and record-writing programme, which is dealt with in the report on those operations. Areas in excess of the approximate programme have been accomplished by other sections in order to complete thanas and estates sanctioned for survey and the grand total of outturn of the Bengal surveys is fully up to the total original programme.

Establishments.

4. The programme of the year was considerably larger than that of the foregoing year; the extra establishment was obtained by training local amins and sub-surveyors.

Changes during the year.

5. There have been several changes during the year under report.

First in importance is the introduction after several experiments of a new kind of paper for the village maps, which while being sufficiently strong to stand field work, is transparent enough to allow of direct reproduction by the vandyke process, thus doing away with the necessity of an intermediate trace. This,

more especially in view of the very large increase in the reproduction of maps which is taking place, will effect a very large saving in tracing and examination, as the process in future will be purely mechanical, and the reproduced copies of maps can be immediately stamped as "true copies" which will greatly enhance their utility and value.

6. During the year under report an experiment has been made in the Bihar traverse section to introduce a system of contract payments for all traverse work in the field and for a considerable proportion of the computing work in office. The experiment has proved successful, notwithstanding the considerable difficulty of reconciling native establishments to any new conditions, and after a little more experience the contract system of traverse work can be generally adopted in Bengal surveys and a considerable saving in cost-rates effected thereby.

7. An experiment which was tried in Ranchi for arriving at some simple and quick method of checking measurements by the sub-tense bar has proved completely successful and all the bars of the Chota Nagpur traverse section have now been altered, and it is hoped that the cost of traversing in hilly tracts will be considerably lowered in future.

8. In the Bengal Drawing Office, the experiment to which reference was made in paragraphs 5 and 36 of last year's report has proved a success, and thana maps have been provided during the year under report at an average cost of less than Rs. 30 per 100 copies of a thana.

9. The work of the Bengal Drawing Office has been much increased by—(*a*) large additions in plant and establishment to the Vandyke reproduction section, to allow of this work being brought up to date, and keeping up with the anticipated increased outturn of the field parties, (*b*) increase to the standard mapping section and provision of more establishment to undertake the compilation of the quarter-inch district maps, and (*c*) formation of a new Record Office with racks sufficient to store all the village maps of Bengal now in hand, and to provide for the probable outturn of the next ten years.

Badar Establishments.

10. The settlement "badars" are dealt with by the field parties concerned. All this work is absolutely up to date.

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND RECORDS-OF-RIGHTS IN TEMPORARILY-SETTLED AND GOVERNMENT ESTATES UNDER SETTLEMENTS OF RENTS AND LAND REVENUE.

MAJOR SETTLEMENTS.

DISTRICT HAZARIBAGH—KODERMA GOVERNMENT ESTATE.

Traverse Survey.

11. This survey was ordered in Government Notification No. 2186, dated 2nd October 1902, and was executed by Mr. T. W. Babonau (in charge of the Chota Nagpur Traverse Detachment).

In all 127 villages, with an area of 120 square miles, were traversed at a cost rate of Rs. 35·0 per square mile. This rate may be considered satisfactory for a small detached area.

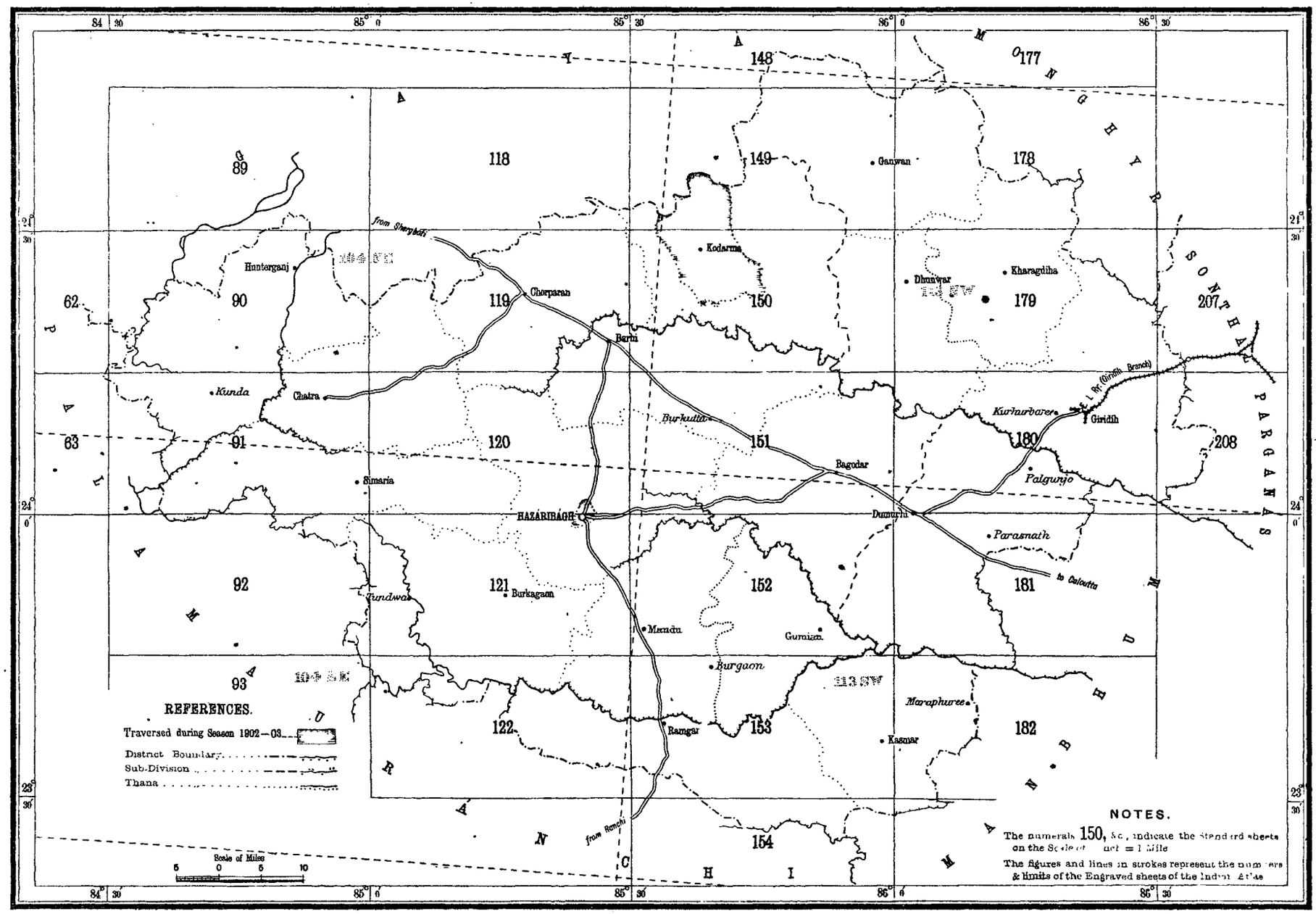
The theodolite stations number 1,621, of which 1,302 are marked with stones, 15 by marks on rocks, and 304 with wooden pegs. No Great Trigonometrical stations were connected with; to connect the angular work, 23 azimuths were observed. The work is plotted on 162 sheets, all on the 16″ scale. The mean magnetic variation is 1° 28′ E. The origin adopted is the intersection of Lat. 24° 00′ 00″ N. and Long. 85° 30′ 00″ East. All the computations have been completed.

The villages traversed fell into thanas Koderma and Hazaribagh, and the detail survey of the former thana was undertaken by the Settlement Officer of South Bihar, and of the latter by the Settlement Officer, Hazaribagh; the 16″ sheets were despatched accordingly.

BENGAL SURVEY.

INDEX TO THE TRAVERSE SURVEY IN DISTRICT HAZÁRIBÁGH.

1902-03.



No 457, B. D. O.—July 03.—30,

No. 606, S. I.—Jan 04.—525

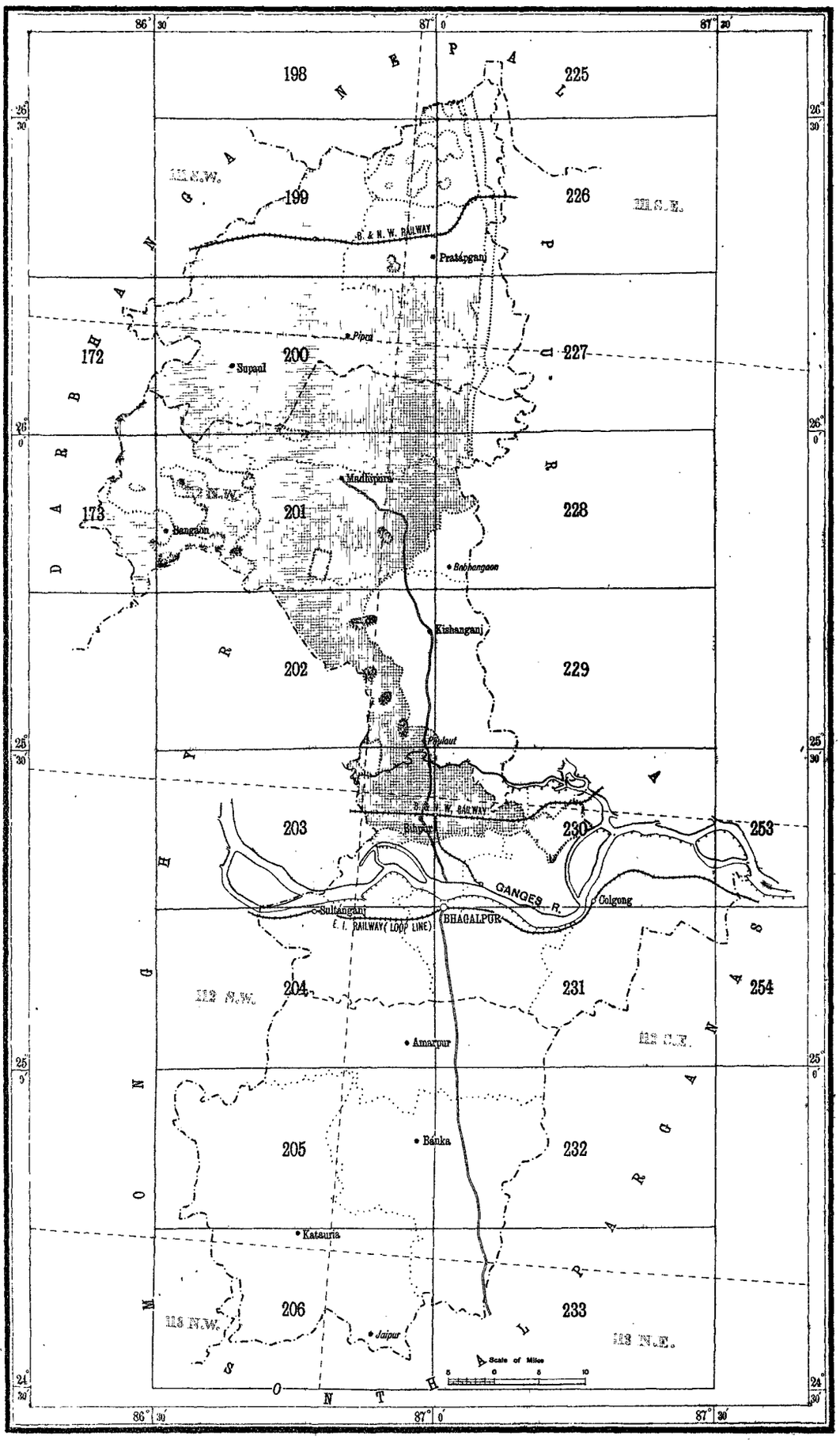
Photo., S. I. O., Calcutta

Reg. No. 607-S. 04.

BENGAL SURVEY.

INDFX TO THE TRAVERSE & CADASTRAL SURVEYS IN DISTRICT BHAGALPUR.

1902-03. No. 4 PARTY.



No. 62[illegible], S. I.—Nov. 03.—[illegible]

Photo. S. I. O., Calcutta.

REFERENCES.

Cadastrally Surveyed in previous Seasons . . . . . .

Do. . . . . do. . . in 1902-03 . . . . . .

Do. . . . . do. . . in 1902-03 without Records . . .

Traversed in 1902-03 . . . . . .

District Boundary. . . . . .

Sub-Division „ . . . . . .

Thana . . . . „ . . . . . .

Reg. No. 944-S. 03.

NOTES.

The numerals **201**, &c., indicate the Standard sheets on the Scale of 1 Inch = 1 Mile

The figures and lines in strokes represent the numbers & limits of the Engraved sheets of the Indian Atlas.

DISTRICT MONGHYR—GOVERNMENT ESTATES.

12. At the request of the Settlement Officer of North Bihar, the Government estates of Amanat Sirkar Bargoria and Itahri, situated to the south of the Ganges river, were surveyed cadastrally on the 16″ scale and a record-of-rights prepared.

As the total area of these estates was very small and the plots comprising them scattered, no traverse survey preceded the detail survey. The area is 0·17 of a square mile, and contains 79 plots.

The work was undertaken by the Bihar Cadastral Section under Mr. A. W. Smart, and the expenditure was Rs. 124.

PART II.—REPORTS ON SURVEYS AND RECORDS-OF-RIGHTS IN PRIVATE ESTATES.

MAJOR SETTLEMENTS.

BHAGALPUR DISTRICT.

Traverse Survey.

13. The traverse programme in this district consisted of the completion of all lands lying to the north of the north high bank of the Ganges river (excluding the Kosi river diara). This programme fell into portions of the thanas of Madhipura, Kishanganj, Bihpur and Colgong. As some 500 square miles of the area were for cadastral survey during the year under report, all the available strength of the Bihar traverse section (under Lieutenant F. C. Hirst) was thrown into the area early in the season. It was found that the Kosi river was flowing in two channels through Kishanganj thana, and that almost the whole of the thana was under water. As there was no hope of this area drying up till March 1903, a sudden change in programme had to be effected. This change delayed progress in the early part of the season and caused unavoidable delay in the issue of plots which threw very heavy work on the two Bihar cadastral sections. The Kosi river appears to have reached the most westerly course which its southern reaches are likely to adopt, and its future movements will probably be towards the east; for this reason every endeavour will be made to complete as much of the Kosi diara during next field season as is possible.

The area accomplished, viz., 572 square miles in 441 villages, was marked by 9,638 new traverse stations, of which 834 were stones, 8,498 earthen cylinders and 306 pegs.

The demarcation was good, but the usual difficulty in connecting on to the traverse stations of the Srinagar-Banaili survey of 1885-87 was experienced. This difficulty, as explained in paragraph 10 of last year's annual report, was due to the traverse marks having been moved by the settlement authorities at the detail survey stage.

Well marked lines along the west bank of the Kosi river and along the north high bank of the Ganges river have been left for future connections and to facilitate relaying of boundaries in the diara areas of those rivers at any future time.

The cost rate of Rs. 26·6 per square mile is low. This is principally due to the large average size of the village in the tract surveyed.

The health of the establishment was good.

Four Great Trigonometrical stations were connected with, and the angular work checked by 59 azimuth observations. The mean magnetic variation works out at 1°38′ east of the true meridian.

The computations are practically complete and will shortly be despatched to Calcutta.

Cadastral Survey.

14. The cadastral survey was executed by both Bihar cadastral camps under Messrs. A. W. Smart and C S. Kraal.

The areas completed were 1,622 square miles of cadastral survey (985 villages with 1,966,842 fields) and 1,594 square miles of record-writing (960

villages and 1,952,689 fields); the total cost was Rs. 2,13,005, which gives a cost rate of Rs. 132·5 per square mile for cadastral survey and records. This cost rate is extremely low considering the number of fields dealt with; it appears slightly higher than the Monghyr rate of last season, but the average size of the field in Bhagalpur has been 0·52 of an acre as against 0·87 in Monghyr. If this is considered, the rate is really lower than that of last season, and this is due to the larger compact programme.

The survey was checked by 7,806 linear miles of partal which gives an incidence of 4·81 linear miles of test survey to each square mile of detail survey.

The entries of 554,913 plots were checked by the survey staff, which gives an average of 28·4 per cent. of the whole number of plots khanapuried.

There were 686 boundary disputes, all of which, except three, have been decided by the Settlement Department; the remainder will be decided at the attestation stage. There were 62,217 interior disputes, of which 728 remain for the attestation stage. There were 35,334 presumptive cases of suppression of raiyats, of which 8,741 remain to be settled; these will be settled at the attestation stage.

The attendance of zamindars and raiyats was good except in thana Bihpur.

The health of the establishments was on the whole good.

The boundary common to Bhagalpur district and Nepal was carefully compared with the map of the 1882-83; the results show that the 1882-83 map is inaccurate along the Tiljuga and Dumrah rivers.

The usual trouble in the comparison of boundaries with Srinagar-Banaili Raj villages occurred, and large overlaps had to be surveyed to reconcile the present boundaries with those as surveyed during the Srinagar Banaili survey. The result is a slight increase in cost rates.

The entire seasons' work has been completed and the traces and records will be in the hands of the Settlement Department in ample time for that Department's requirements.

District Purnea.

Traverse Survey.

15. During the season under report the North Bihar traverse section under Lieutenant F. C. Hirst took up the traverse survey of the upland portions of thanas Gondwara (now Korah), Dhamdaha, Purnea and Raniganj, omitting the villages of the Srinagar-Banaili Raj and Maldwar estates.

In all a programme of 1,189 square miles lying in 1,182 villages was dealt with.

The origin adopted is the intersection of Long. 87°40′ E. and Lat. 25°50′ N.; this origin was chosen as suitable for the whole district when the Surjapur pargana was traversed in 1901.

There are 19,776 theodolite stations in the area, of which 2,148 are marked with stones, 16,691 with earthen cylinders and 937 with pegs.

Four Great Trigonometrical stations were connected with, and the angular work was checked by the observation of 132 azimuths. The mean variation of the magnetic needle proved to be 1°44′ east of the true meridian. The computations are practically complete, and the usual tables of mathematical results will shortly be submitted to the Surveyor-General's office.

The health of the establishment was good.

The expenditure was Rs. 56,830, which gives a cost rate of Rs. 24·3 per square mile.

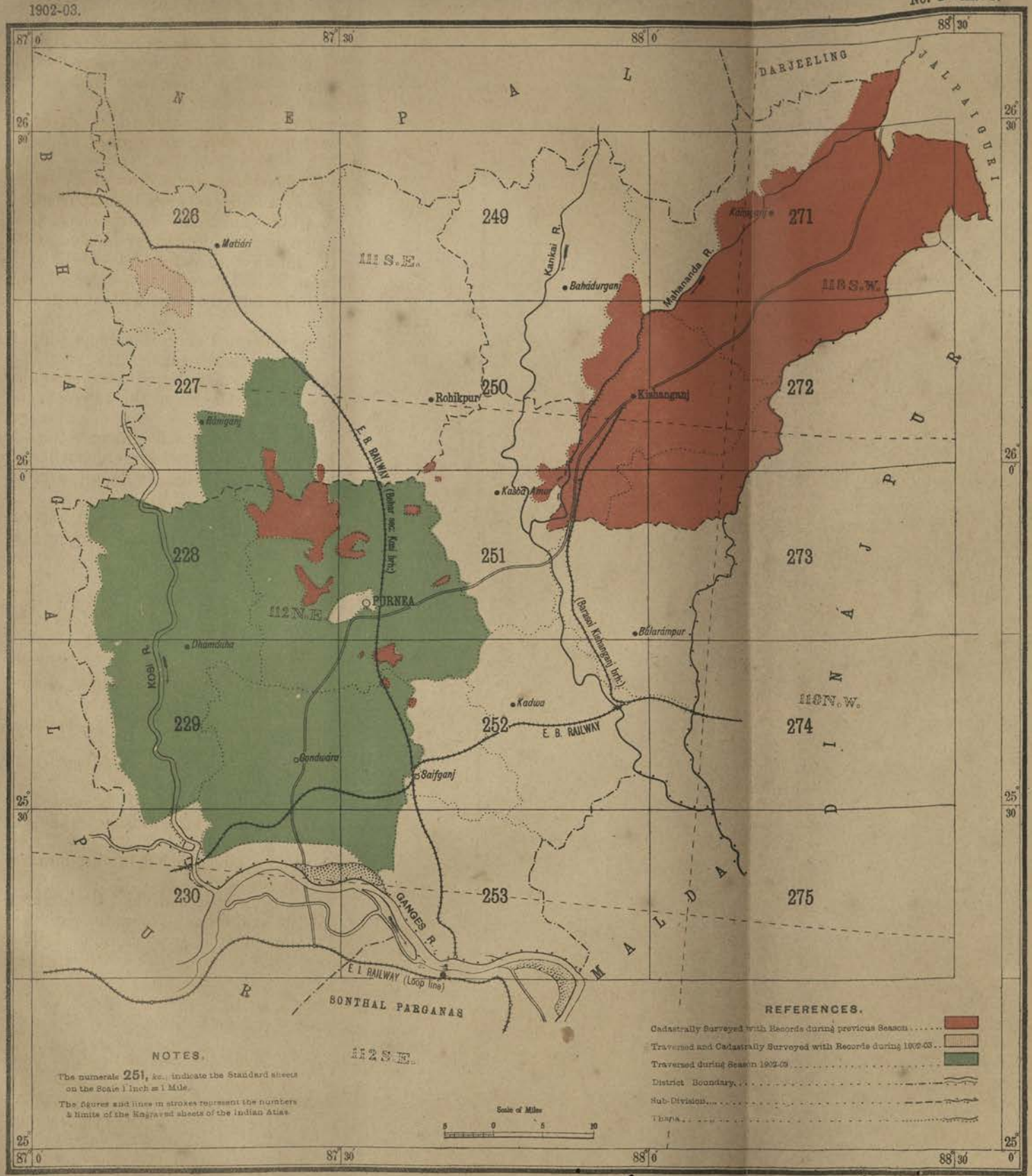
This cost rate is very low, and is due to (*a*) large and compact programme, (*b*) good preliminary demarcation which had been seen to by Messrs. Pyne and Wodschow of the Darbhanga Raj, (*c*) employment of a contract payment system in part of the area, (*d*) large villages, (*e*) healthy tract of country and (*f*) labour easily obtainable and at cheap rates. In fact this survey was carried out under the most favourable circumstances we have yet met with in Bengal and the rate is not likely to be lowered or equalled except by the extension of the contract system.

BENGAL SURVEY.

INDEX TO THE TRAVERSE & CADASTRAL SURVEYS IN DISTRICT PURNEA.

1902-03.

No. 4 PARTY.



No. 617. S. I.—Nov. 03.—525.

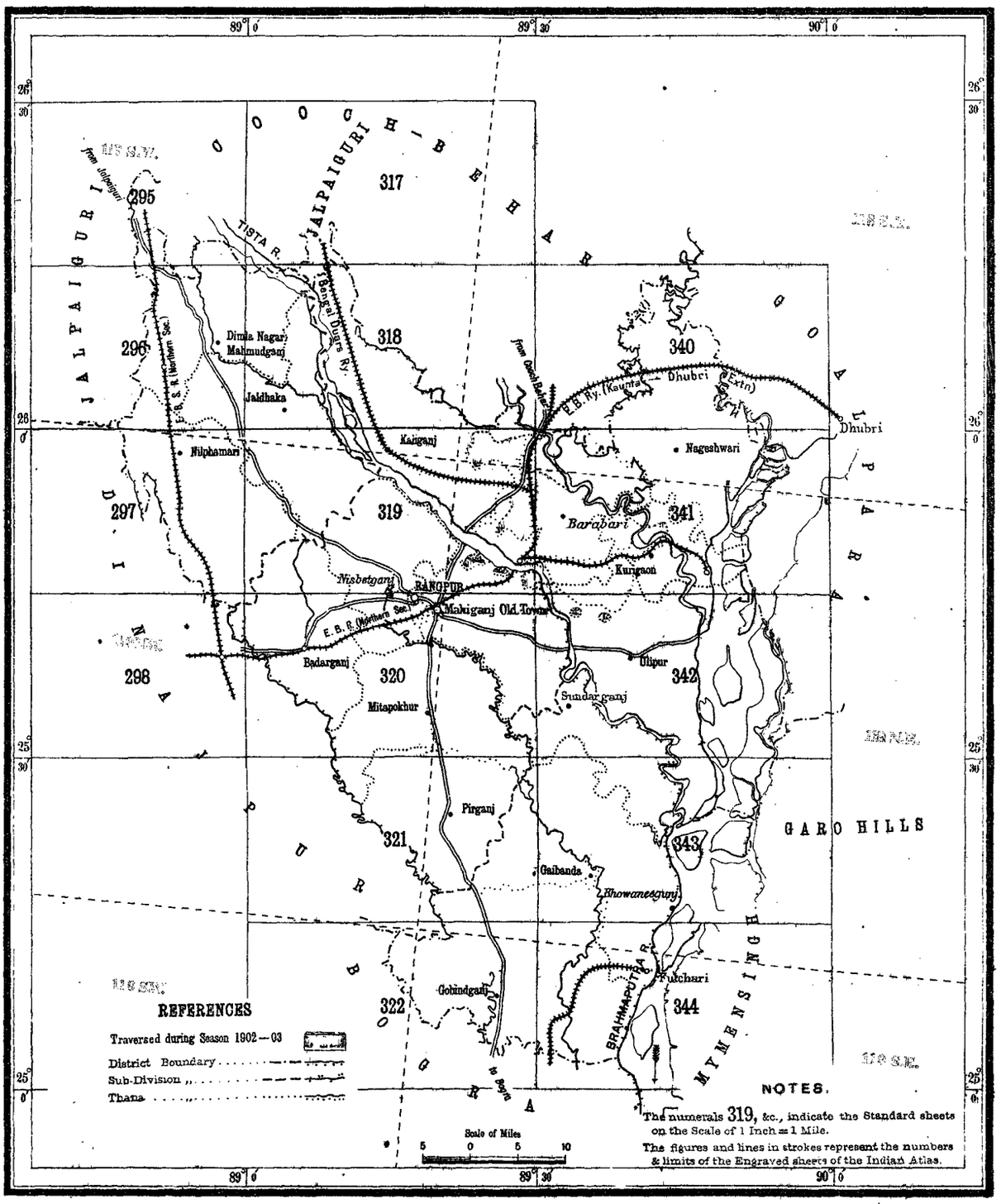
Photo. S. I. O., Calcutta.

Reg. No. 935-S. 03.

BENGAL SURVEY.

INDEX TO THE TRAVERSE SURVEY IN DISTRICT RANGPUR.

1902-03.



No. 467, B. D. O.—July 03.—30.

No 606, S. I.—Jan. 04.—525

Photo., S. I. O., Calcutta

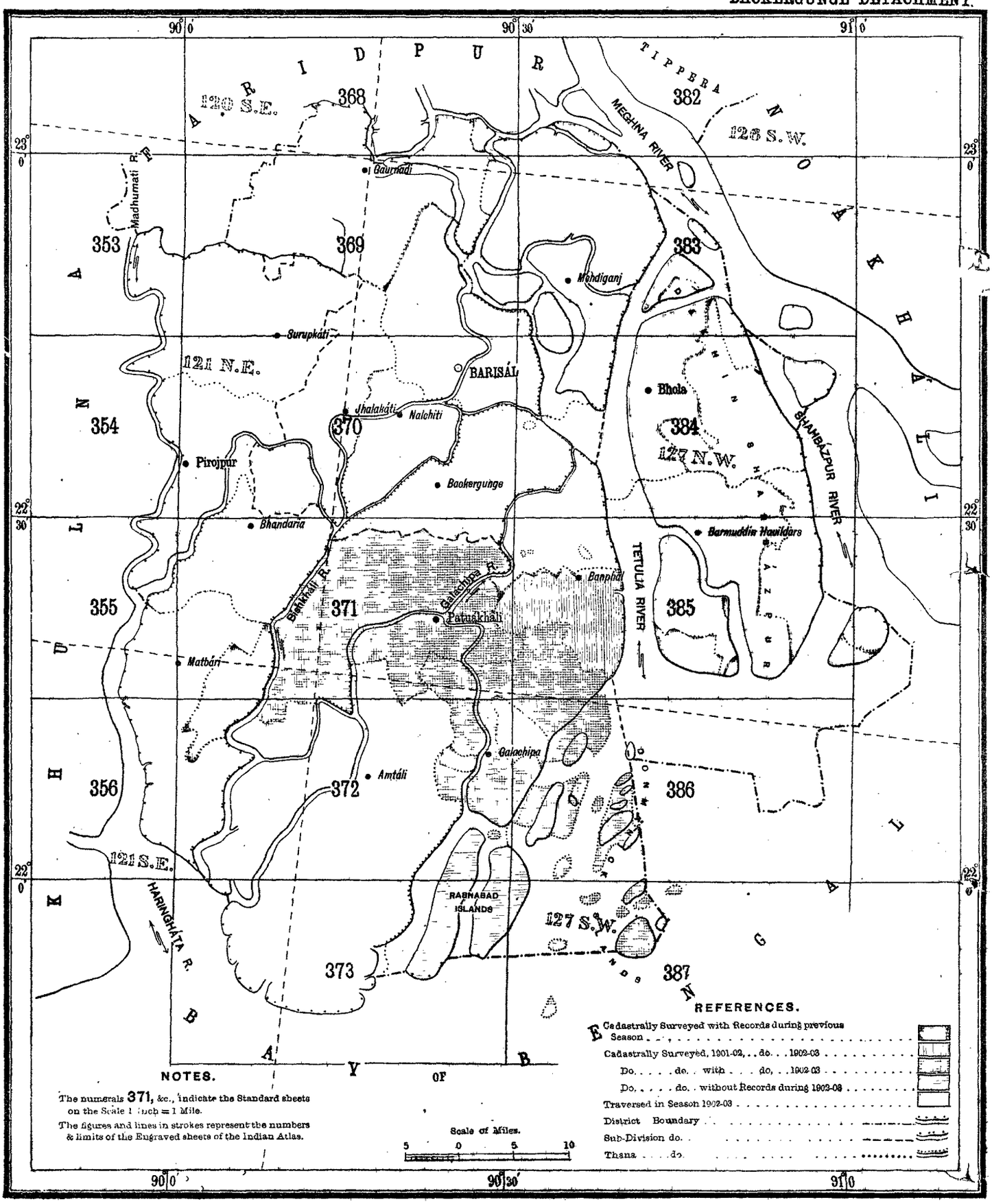
Reg. No. 609-S. 04.

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT BACKERGUNGE

1902-03

BACKERGUNGE DETACHMENT.



NOTES.

The numerals 371, &c., indicate the Standard sheets on the Scale 1 inch = 1 Mile.

The figures and lines in strokes represent the numbers & limits of the Engraved sheets of the Indian Atlas.

REFERENCES.

Cadastrally Surveyed with Records during previous Season

Cadastrally Surveyed, 1901-02, . . do. . . 1902-03

Do. . . . . do. . with . . . do, . . 1902-03

Do, ... do. . without Records during 1902-03

Traversed in Season 1902-03

District Boundary

Sub-Division do.

Thana . . . . do.

No. [illegible] —525.

Photo. S. I. O., Calcutta.

Reg. No. 958-S. 03.

District Rangpur—Cooch Behar Estates.

Traverse Survey.

16. The traverse survey of these estates was executed by the Bihar Traverse Section under Lieutenant Hirst early during the survey year because the cadastral survey was to have been completed by the Settlement Department during the same year.

The area completed is 88·48 square miles lying within 254 villages.

There are 4,089 theodolite stations which are marked by 714 stones, 3,259 cylinders and 116 pegs. The exterior limits of this scattered work have been very carefully marked by stones, so that there should be no difficulty in connecting on to this work should the remainder of the district come under survey at a future date. Forty azimuths. were observed and the deduced mean variation of the magnetic needle works out at 1°52′ east of the true meridian.

The expenditure was Rs. 5,045, which gives a cost rate of Rs. 57·3 per square mile. This cost rate is very high and is due to the unhealthy climate of the area in which the estates lie, the apathetic and sometimes obstructive attitude of the inhabitants, the scattered nature of the work and consequent expense in providing proper supervision, and also to the small size of the villages. Lieutenant Hirst visited Rangpur at the end of December 1902 and found that, despite the very earnest endeavours of Mr. Sen, the Manager of the estates, the attitude of the inhabitants was obstructive. The situation was explained to Mr. Mitter, Collector of Rangpur, and that officer took action immediately, with the result that the work was completed without further trouble.

One Great Trigonometrical station was connected with, and the computations have all been completed; the village plots were sent to the Collector at the end of April and are lying with him pending the appointment of an officer to take up the cadastral survey.

District Backerganj.

Traverse Survey.

17. The traverse survey operations in this district, under Mr. C. H. H. Johnson, were in continuation of those of the previous year.

The total area traversed was 1,027 square miles, but this figure includes 131 square miles of riverain water-covered area inside which no sub-traversing was done; the area traversed may therefore be taken as 896 square miles for the purpose of calculating cost rates.

The programme consisted of the completion of the areas in Bhola Island hitherto not traversed and cadastrally surveyed, and the traverse survey of thanas Mehendiganj and Gournadi.

There were 21,583 theodolite stations in the area, of which 1,888 were marked by stones, 32 by cylinders, and 19,663 by pegs.

Two Great Trigonometrical stations were connected with.

The angular work was checked by 120 azimuths, and the mean magnetic variation is 1° 26′ east.

The demarcation was bad owing to the extremely apathetic attitude of the inhabitants. An attempt to carry out the demarcation by the sub-surveyors was stopped by my orders, as I found the sub-surveyors made demarcation work an excuse for poor outturn. After this the sub-surveyors proceeded with their traversing using their traces as a guide.

The expenditure incurred was Rs. 39,041, which gives a cost rate of Rs. 43·6 per square mile. This is a very great reduction on previous cost rates and is mainly due to the fact that this camp also completed the traverse of some 650 square miles in district Midnapore.

The country dealt with was unhealthy, being either water-logged or intersected by small *khals*. The health of the establishment was indifferent and owing to some tracts being under water a small amount of revision work has been unavoidably left over to be dealt with next year; the final computations are therefore incomplete, but the strength of the office establishment of this Detachment has been increased so as to obviate any chance of serious arrears.

Cadastral Survey.

18. The programme of cadastral survey comprised the completion of the Backerganj, Patuakhali and Galachipa thanas in both survey and record-writing. The cadastral survey only of the Rabanabad islands, and the completion of the record-writing in thana Baufal. In all 574 square miles were cadastrally surveyed, and the record-writing of 567 square miles completed.

The survey has been tested by 1,971 linear miles of "partals" which give an incidence of 3·4 linear miles per square mile of survey. For arriving at this average the river blocks have been excluded.

The entries against 74,745 plots were checked by the survey staff, which gives an average of 17 per cent. of the total number of plots

There were only 31 boundary disputes and 5,121 disputes regarding entries in the record, all of which have been decided by the Settlement Department.

All the records of the year have been completed in every respect and great progress has been made in clearing off the arrears of 1901-1902. It has not been possible to complete all the arrears, as some of the records were still in the hands of the Settlement Department, but all this work will now be done with at an early date.

In accordance with the orders of the Board permitting the introduction of a proportion of up-country Inspectors and amins, one-fifth of the Inspectors and rather less than one-eight of the amin establishment consisted of up-country-men. The up-country amins were not employed on "khanapuri." The expenditure on cadastral survey was Rs. 65,889 and on records Rs. 30,065; the resulting cost rates being Rs. 114·7 and Rs. 53·0 per square mile.

These rates are much lower than those of last season. In my last report I anticipated considerable savings during this year on account of—(*a*) the introduction of a proportion of foreign amins, (*b*) reduction of plot numbers in village sites, and (*c*) the use of the new abbreviated "khasra" form. These three items to which may be added (*d*) much larger field, (*e*) a new system of payment to amins, and (*f*) abler management on the part of the officer in charge account for the decrease in cost rates.

Payment for survey work instead of being made separately to the amin and his coolies were made only to the amin and included cost of coolie labour based on a reasonable daily outturn of survey. The result being that a lazy amin who has to pay for his own coolie hire suffers if he does not give a fair outturn of work. This procedure also decreases the amount of accounts work in office and is most suitable when dealing with lazy field establishments, but with energetic amins whose outturns increase with experience the Bihar system of paying amins and coolies separately is preferable for many reasons.

DISTRICT MIDNAPORE.

Traverse Survey.

19. The traverse survey of the Majhnamutha and Jalamutha estate and certain other Government estates was undertaken by Mr. C. H. Johnson (in charge of the Backerganj Traverse Detachment), after the completion of his programme in Backerganj district.

The total area to be dealt with was originally estimated by the Collector as 500 square miles, but this estimate was found to be much too small and the actual area for survey is 690 square miles; of this area during the year under report, 655 square miles were traversed, and the balance will be dealt with next year.

There are 16,949 theodolite stations, of which 3,767 are marked by stones, 55 by cylinders and 13,127 by pegs. The large number of stones used is due to the careful marking of stations which fall on the outside limits of each scattered block surveyed. This procedure was necessary, in order to ensure proper connections to this work being forthcoming if the remainder of the district is surveyed in the future.

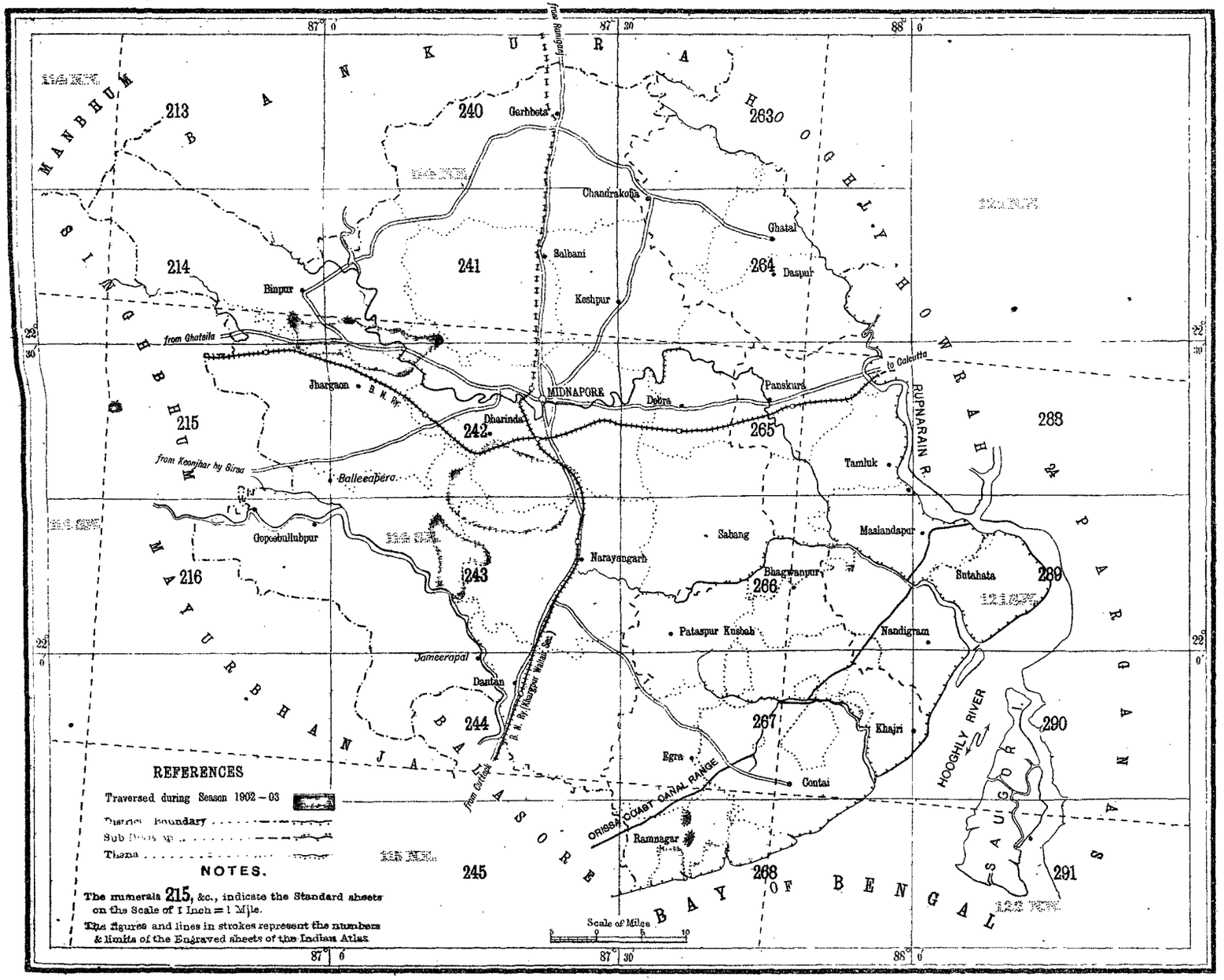
Thirteen Great Trigonometrical stations have been connected with.

To check the angular work 125 azimuths were observed; the mean magnetic variation derived from them is 1° 15′ East.

BENGAL SURVEY.

INDEX TO THE TRAVERSE SURVEY IN DISTRICT MIDNAPORE.

1902-03.



No. 457, B. D. O.—July 03.—30.
No. 606, S. I.—Jan. 04.—525

Photo., S. I. O., Calcutta

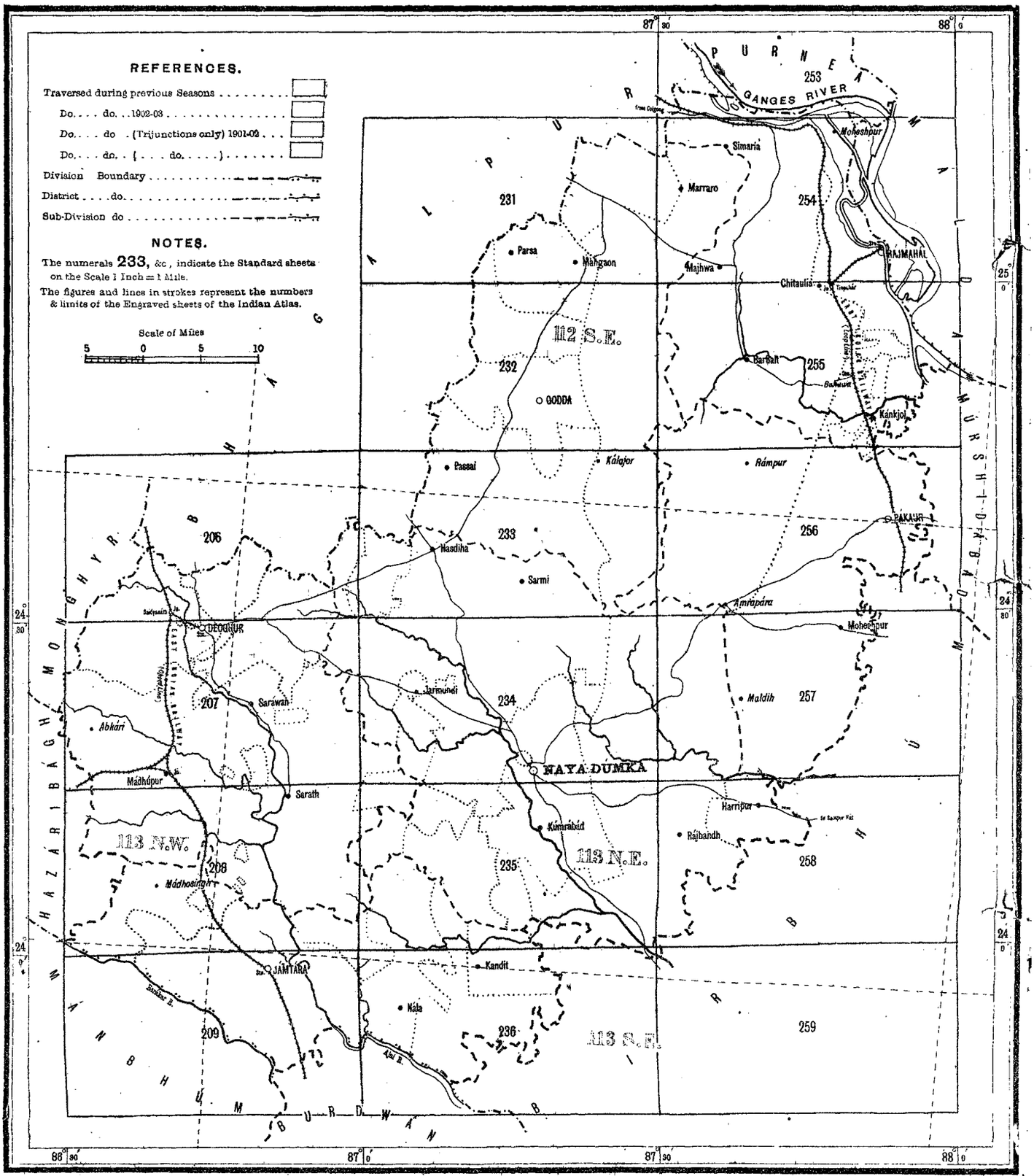
Reg. No. 608-S. 04.

BENGAL SURVEY.

INDEX TO THE TRAVERSE SURVEY IN DIST. SONTHAL PARGANAS.

1902-03

DETACHMENT.



No. 607, S. I.—Nov. 03.—525

Photo. S. I. O., Calcutta.

Reg. No. 959-S. 03.

No preliminary demarcation was done by the inhabitants; this may be partly explained by the fact that only very short notice, before commencement of survey, could be given, but our experience in all surveys dealing with scattered estates, has been that great ignorance exists as to the whereabouts of the estate lands and to this fact the defective demarcation may be principally attributed.

The health of the establishment was good.

Practically all the computations have been completed and the work proves well.

The expenditure was Rs. 25,189, which gives a cost rate of Rs. 38·5 per square mile. This rate is fair, if the scattered nature of the work and the small size of the villages is considered. The rate would be lower with large compact areas, but a very low rate cannot, however, be expected in Midnapore district where labour is expensive.

The cadastral survey will be taken up almost immediately by the Midnapore cadastral Detachment; this is a new Detachment: and has been formed by the conversion of the Sonthal Parganas Detachment (Traverse) into a Cadastral Section.

In all 1,766 villages have been traversed and mapped on 1,037 sheets. The origin adopted was the intersection of Lat. 22° 30′ N. and Long. 87° 30′ E.

District Sonthal Parganas.

Traverse Survey.

20. The programme of the traverse survey of this district, under Mr. C. S. Gasper, consisted of the completion of the district, but, at the request of the Settlement Officer, 103 square miles of Ganges diara lands, lying in the Rajmahal sub-division were not traversed.

The areas accomplished are 861 square miles of mauzawar traverse for cadastral survey by the Settlement Department, and 1,298 square miles of trijunction traversing in the area surveyed by Mr. Craven. The object of this trijunction traversing was, as explained in my last Annual Report, is to provide a basis for the utilization of Mr. Craven's map in the completion of the standard sheets.

There are 31,512 theodolite stations which have been marked by 4,343 stones and 27,169 pegs.

Two Great Trigonometrical stations were connected with.

To check the angular work, 272 azimuths were observed, from which a mean magnetic variation of 1° 31′ East has been derived.

The preliminary demarcation by the inhabitants was excellent; and the health of the establishment very good.

The computations have all been completed in every respect, and the work proves well. The expenditure was Rs. 24,330 on mauzawar traversing, and Rs. 18,350 as trijunction traversing. The resulting cost rates per square mile are Rs. 28·3 and Rs. 14·1, respectively. These low rates are due to much the same reasons as already given for the low traverse rates in Purnea.

This Detachment will now be broken up and re-cast as a cadastral section, to take up the cadastral work in Midnapore district. With this object in view, the Detatchment recessed at Midnapore.

District Ranchi.

Traverse Survey.

21. The traverse survey of the Munda country in district Ranchi was continued by the Chota Nagpur Traverse Detachment under Mr. T. W. Babonau. The areas accomplished fell into thanas Tamar, Silli, Karra and Khunti and comprise 1,001 square miles in all.

The angular work was checked by 152 azimuths, and the mean magnetic variation is 1° 13′ east.

One Great Trigonometrical station was connected with.

The country traversed is rough or hilly, necessitating frequent use of the subtense bar. The hills average 1,500 feet high and are generally jungle-clad. The establishment suffered very considerably from malarial fever.

There were 19,178 theodolite stations; of these 14,257 are marked with stones, 408 are marks on rocks *in situ* and 4,513 are marked with pegs. The stones at trijunction points are distinguished from stones at other points by having a triangle and dot cut on them, other points being indicated by a broad arrow only.

Owing to there having been no revenue survey of the Ranchi district, boundary disputes between villages are very numerous. The Settlement Officer intends putting forward proposals by which the actual trijunctions of villages as now decided may be permanently marked by the erection of a cairn over the mark.

The total cost of the work was Rs. 28,925, which gives a cost rate of Rs. 28·9 per square mile. This rate is particularly satisfactory considering that about one-third of the work was in hilly country. The area was compact and the full programme and large average size of the village account for a portion of the lower cost rates, but the healthiness of the tract dealt with as compared with that of the previous season is the main cause of the reduction.

The records have all been completed and the usual table of Mathematical results will be despatched to the Surveyor-General's Office in due course.

Cadastral Survey.

22. The cadastral survey of the Munda country was commenced by the Ranchi Cadastral Detachment under Mr. W. Skilling, but, owing to unavoidable circumstances, there was a considerable failure in the programme which was to have been accomplished. The area dealt with was 616 square miles of cadastral survey and 437 square miles of record-writing, all of which falls within Thanas Khunti and Tamar. The reasons for the failure in completing the original assigned programme are:—(*a*) The difficulty of the country, (*b*) the extreme unhealthiness of the tract dealt with, (*c*) the incapacity and total unreliability of the local man as an amin.

The unhealthiness of this portion of the district may be gauged by the fact that in one inspector's area alone 78 amins had, at different times, to be sent to complete the survey and khanapuri of a block of 28 square miles.

The survey has been tested by 1,942 linear miles of "partals" which gives an incidence of 3·13 miles of test survey to each square mile surveyed. In addition to the above 37 blocks were resurveyed as "partals."

The entries of 54,720 plots were tested by the survey staff; this represents 25% of the whole number of plots khanapuried.

There were 269 boundary disputes, all of which except 16 have been decided by the Settlement Department; these 16 will be dealt with at attestation. 5,386 entries in the record-of-rights were challenged; of these 4,579 have been settled and 807 left over till the attestation stage.

The expenditure was Rs. 52,159, the cost rates for survey and khanapuri being Rs. 61·7 and Rs. 32·3 respectively.

These rates are very low and are accounted for mainly by the large fields (1·25 acres average) and by the fact that labour was supplied free.

For cases of repeated non-attendance, fines, aggregating Rs. 171, were levied.

Some discrepancies between the Singhbhum and Ranchi common district boundary remain to be adjusted. As these differences could not be discovered till late in the season, their adjustment must wait till the next survey year. In all other respects the work is entirely completed.

PART III.—REPORTS ON MISCELLANEOUS SURVEYS.

BHAGALPUR DISTRICT.

Bhagalpur Municipality.

23. The traverse survey of this municipality was undertaken by the Bihar Traverse Section at the close of the field season 1902-03. It was decided to survey such portions of the area as permitted of it on the 16″ scale; and such as were congested on the 64″ scale. In this way the cost of survey of the uncongested portions would be reduced to a minimum. The whole area

BENGAL SURVEY.

INDEX TO THE TRAVERSE & CADASTRAL SURVEYS IN DISTRICT RANCHI.

CHOTA NAGPUR DETACHMENT.

1902-03.

Photo. S. I. O., Calcutta.

No. 560. S. I.—Nov. 03.—525.

Reg. No. 936-S. 03.

(8·81 square miles) has been traversed at a cost of Rs. 1,451, but a number of sub-traverses still remains to be run in such portions of the area as may be notified by the Cadastral officer to the traverse camp.

One thousand nine hundred and twenty-five theodolite stations have been marked; of these 63 are marked with stones, 760 with cylinders, 643 with bricks and 459 with pegs.

The angular work was checked by two azimuths and all the computations are completed, but the records are not finally closed owing to the extra sub-traverses mentioned above.

The detail survey was commenced at the close of the year under report, but no appreciable outturn was affected. The expenditure to date is Rs. 27.

The total expenditure is provided for by deposits made by the Municipal authorities.

The origin adopted is that used for that portion of the district, viz., the intersection of N. Lat. 25° 50′ and E. Long. 86° 50′.

Darbhanga District.

Rosera Municipality.

24. The traverse survey of the urban area of this municipality was undertaken by the Bihar traverse section. The "raiyati" area was omitted from the operations, as it had already been surveyed during the survey of the district.

The area of the urban area is 0·49 of a square mile. This has been divided into 14 blocks, which have been connected into the old Darbhanga traverse work, many of the old traverse stations being forthcoming; 535 new theodolite stations have been put down, of which 39 are marked by cylinders, 461 by bricks and 35 by pegs. Two azimuths were observed and the angular and linear measurements all prove well.

The detail survey was undertaken by the cadastral section under Mr. C. S. Kraal.

During the year 282 acres were surveyed and 1,467 plots khanapuried. The total cost incurred for traverse and detail survey is Rs. 1,228, but the survey and record-writing are not yet completed. The expenditure is met by deposits.

Monghyr District.

25. The relaying of the revenue survey boundary of mauza Darobast in pargana Abheypur was undertaken at the request of a local "zamindar" by the Bihar traverse section. The work was temporarily suspended, while in progress, owing to a boundary dispute having arisen and again after resumption was much delayed by the applicants constant complaints that the work was not being correctly done. Eventually owing to the approach of the rainy season the work had to be abandoned, but will be completed next season after deposit of the further estimated expenditure. The cost incurred to date is Rs. 466 which is met by deposits.

Shahabad District.

26. In paragraph 29 of the last annual report it was stated that the traverse survey of the Taufir Bhedia estate had been completed. It has since transpired, that owing to the Collector having provided a trace map of the Bhedia estate, and not that of Taufir Bhedia the wrong estate was traversed. The Taufir Bhedia estate has now been traversed, but on completion of the work the Maharani of Dumraon petitioned that the boundaries of the villages forming the estate be laid down in accordance with several different previous surveys. This work will be attended to next season. The expenditure during the year under report was Rs. 312, which is met by deposits.

Traverse of Surajpura Estate.

27. Three scattered villages of the above estate were traversed by the Bihar Traverse Section under Lieutenant Hirst at a cost of Rs. 123.

Forty-six new theodolite stations were embeded, of which 19 are stones and the balance cylinders.

The area of the villages is 2·11 square miles.

The plots, on the 16″ scale, were sent to the Collector at the beginning of April 1903.

The expenditure is met by deposits.

Traverse and Demarcation of Umarpur Diara.

28. This work is referred to in paragraph 30 of my last report, and was re-commenced on 24th April 1903. Owing to the late receipt of orders, it was found impossible to comply with the Collector's request to mark the actual boundary permanently; in a measure this was perhaps fortunate, as it is very doubtful if any marks erected along the portion of the boundary which lies in the bed of the Ganges river will remain. The necessary points have been marked with stout wooden posts 8 feet long, and if it is found at the beginning of next season that these posts have not been washed away, the boundary will be marked by permanent marks.

Twenty-eight linear miles of new chaining were run, and 74 points at which the theodolite was erected marked by 11 stones, 2 pegs and 61 cylinders.

The expenditure was Rs. 468, which is met by deposits.

The work was undertaken by the Bihar Traverse Section.

District Purnea.

29. The survey of nine villages of parganna Harwat in thana Forbesganj was ordered in Government Notification No. 396L.R., dated 24th January 1903.

The traverse survey was undertaken early in the season by the Bihar Traverse Section under Lieutenant Hirst.

The area accomplished was 21 square miles: this necessitated the observing of one azimuth (by which the angular work was checked), and the embedding of 383 new theodolite stations; all these stations are marked with pegs, because the villages fall into the Kosi river diara lands. The expenditure is Rs. 625, which gives a cost rate of Rs. 29·8 per square mile.

This work will probably be connected with next year, and the origin adopted is that used for the whole district.

The cadastral survey and record writing were undertaken by Mr. C. S., Kraal.

The survey and khanapuri of 9,317 fields was accomplished.

The survey was checked by 69 linear miles of "partals," which give an incidence of 3·29 linear miles of check survey to each square mile.

The khanapuri of 1,848 plots was checked; this is equivalent to 20 per cent. of the total khanapuried.

Twelve boundary disputes and 818 interior disputes were instituted; all these disputes, except four of the latter nature, have been settled There were 50 plots in which oppression of raiyats was alleged; these have all been left for the attestation stage.

The cost of the work was Rs. 2,191, which gives a cost rate per square mile of Rs. 50 and Rs. 55 for cadastral survey and records, respectively.

Calcutta Suburbs Survey.

30. Under orders conveyed in Bengal Government's Notification No. 459M., dated 31st January 1903, the survey of the added area of the town of Calcutta, on the scale of 50 feet to 1 inch, was commenced in February 1903. The area to be dealt with comprises about 8,000 acres, and the survey is being carried on in lines similar to those adopted when the town of Calcutta was surveyed between 1886 and 1893; the main difference is that in the present survey, the boundaries of each municipal holding are being demarcated, and the areas of each holding extracted. Part of the area for survey, embraces the Panchanagram Government estate; in this area the boundaries of the revenue holdings are being demarcated as well as those of the municipal holdings, and will probably be mapped on a separate map. Owing to the inability of the

Surveyor-General to provide a party, the work has been placed under Mr. R. B. Smart (a retired officer of the Survey Department), whose work has been supervised by me.

The area has been divided into four main circuits, comprising 21 subdivisions or 376 blocks; in traversing these the work was confined to following main streets and roads, and as the detail survey of any block was taken up, such extra traversing, as was found necessary to enable the detail surveyor to accurately map the interior details, was then completed. Seven thousand, nine hundred and fifty-three acres have been traversed by following main roads, and the necessary sub-traverses for detail survey have been completed in 3,203 acres.

The detail survey of 2,216 acres has been completed, and out of 10,178 plots (these figures were obtained from the Calcutta Corporation), 980 have been demarcated.

The attendance of owners has, on the whole, been good.

The Ochterloney Monument which is the origin of the Calcutta survey, has been maintained as the origin for this survey.

The traverse stations have been marked, when possible, on municipal marks such as main holes, gully-pits, curb-stones, etc. Where such permanent points were not to be had, iron pins, 9″ long, were driven into the ground, and their positions recorded in measurements from some permanent object close by.

The work has been carefully partalled by Mr. Smart, European supervisors and inspectors.

The total cost up to date is Rs. 31,132. In the present in complete state of the work, it would be misleading to give a cost rate per acre.

In the work 234·15 linear miles of traverse have been run, and 5,818 traverse stations marked. These figures will, of course, increase as the detail survey proceeds.

PART IV.—REPORT ON THE BENGAL DRAWING OFFICE.

31. Mr. W. H. Penrose was in charge of this section till the 11th November 1902; between that date and 1st December 1902, Messrs. A. B. Smart (Senior) and H. H. Hanby were, respectively, in charge; for the rest of the year Mr. E. F. Berkeley has held charge.

The work has been carried on by five different sections, each of which is separately reported on below. A sixth section (Record section) was in process of formation towards the end of the year. Sanction was accorded for the erection of two racks, capable of storing all the existing cadastral sheets of Bengal, and those likely to be compiled for the next ten years. These racks are now nearly complete, but the detailed report on this section will be defferred till the next Annual Report. Besides the work referred to below, a certain amount of miscellaneous work has been dealt with which it is not proposed to report on in detail here.

Standard and District Mapping Section.

32. *Programme*—(*a*) Completion and correction of fair mapping of 32 standard sheets of Orissa.

(*b*) Completion and correction of the fair mapping of eight standard sheets of Bihar (excluding Darbhanga district), and the fair mapping of 14 standard sheets of district Darbhanga.

(*c*) The completion of the fair mapping of 15 sheets of district Chittagong.

(*d*) Preparation of as many district maps of Orissa, Bihar and Chittagong, on the scale of 4 miles to 1 inch as could be undertaken.

As regards (*a*).—Out of the 32 standard sheets of Orissa, 28 have now been completed and sent for publication. The remaining four are expected to be completed during October 1903.

As regards (*b*).—Seven sheets of Bihar have been sent for final publication, and the 8th has been unavoidably delayed owing to difficulties in incorporating Colonel Tanner's Topographical work (done betwen 1883 and 1885), in the present edition. The Deputy Surveyor-General has now passed orders on this point and the remaining sheet will be sent for publication immediately.

As regards the 14 sheets of the Darbanga district, six have been plotted during the year; this completes the plotting of the whole district; the transfer of reductions has been completed in seven sheets (this was done previously in three other sheets), a balance remains therefore of four sheets to complete the district. The village names and outlining on five sheets has been completed this year.

The pentagraph reductions of 7,170 (16″) sheets of Darbhanga to the 2″ scale have now been completed; the total number of sheets in the district is 9,007.

The transferring of reductions of 4,793 sheets have now been dealt with; of these 3,324 were completed during this year.

The completion of the Darbhanga sheets has been delayed for two reasons—(1) the urgency of dealing with the Orissa sheets first, and (2) insufficient establishment. Extra establishments have been sanctioned during the year under report and the Darbhanga standard mapping should be out of hand by 1st April 1904.

As regards (*c*).—The Chittagong mapping has progressed slowly. This is due to the extreme difficulty of reconciling differences betwen the various surveys whose materials form part of the sheets. The difficulties have now been settled by the Deputy Surveyor-General. Up to date one sheet has been sent for publication, the hills have been mapped on two sheets, and the preliminary examination of four sheets has been completed. It is hoped that the 15 sheets of Chittagong will be sent for publication during this financial year.

Preparation of $\frac{1}{4}$ inch District maps.

33. The preparation of these maps is a new undertaking for the Bengal Drawing Office. Owing to pressure of other work, this work could not be undertaken till late in the year under report.

The district map of Muzaffarpur has been practically completed and that of Balasore is well advanced; both these should be ready for publication during the current financial year. A start has been made with the district map of Saran and the other districts which have been completed in survey will be taken in hand as soon as possible.

Thana Mapping Section.

34. The compilation of thana maps on the 1-inch scale has made good progress during the year. Out of the 24 thanas of Orissa, nine now remain for publication. Of the 29 thanas of Bihar (excluding Darbhanga) only two remain for publication.

The thana mapping of Chittagong could not be proceeded with, as the standard sheets were not ready. This work as well as that of Darbhanga will be seen to early next season.

By the new method of compiling these maps and reproducing same by the Vandyke process, the average cost of 100 copies of a thana map is less than Rs. 30.

Reproduction of Village Maps.

35. *Programme.*—Reproduction by the Vandyke process of 10 copies each of

(*a*) the remaining 16″ sheets of Orissa.
(*b*) 16″ sheets of Saran (added to the programme subsequently).
(*c*) 5 copies extra of each of 132 sheets of Chittagong (added to the programme subsequently).

As regards (*a*).—In the Orissa work, 5,916 sheets were traced, 5,067 examined and 5,300 reproduced. Only 1,362 sheets of Orissa now remain to be reproduced; these should be completed in November 1903.

As regards (*b*).—The reproduction of the sheet of Jaipur Government estate in district Bogra, and those of the Kalimpong survey (district Darjeeling) was in the original programme, but was set aside, as the work in Saran district was considered more urgent. The Saran work was not commenced till late in the year and only 604 sheets out of 6,996 were traced.

It is estimated that the reproduction of the 16″ sheets of the Saran district will be completed by the end of March 1904.

Bihar Badar Section.

36. The badars of 158 villages were received during the year; as there was a balance of three villages remaining from last year (*vide* paragraph 35 of my last report), there were, in all, 161 to be dealt with. Of this number 158 have been corrected and the balance (three) are in hand.

The village names and thana numbers have been entered in the traverse tables of 608 villages of district Muzaffarpur; the headings of 1,765 sheets and adjoining names of 3,918 sheets were corrected according to the thana lists; these sheets belong to Muzaffarpur and Saran districts.

When comparing the areas as given in the thana lists with those given in thealphabetical lists, discrepancies were found. All such cases, when the percentage was over that allowed by this Department, were or are being rectified by reference to the Settlement Officer.

This section also compared and corrected the areas of 912 villages in district Muzaffarpur.

Orissa Badar Section.

37. Prior to the order to discontinue the correction of the Orissa maps in accordance with the Settlement traces, the interior details of 46 villages of districts Cuttack and Puri had been corrected. For the remainder of the year the section has been engaged in the correction of headings of 8,831 sheets; the correction of the adjoining names of villages on 751 sheets; the correction of the headings only in the traverse volumes of 1,038 villages and the preparation of alphabetical lists of 2,423 villages.

CHAPTER III.

PART I.—TOURS OF SUPERINTENDENT PROVINCIAL SURVEYS.

I have been in the field and on tour for 216 days, and Lieutenant Hirst for 54 days. I visited each section of the Bengal Surveys on an average three times during the field season, and Lieutenant Hirst visited each section at least once during my absence on leave.

PART II.—SERVICES OF OFFICERS.

Lieutenant F. C. Hirst, I.A., acted for me while I was on privilege leave and has conducted my office to my entire satisfaction; in charge of the Behar Traverse Section he has shown great keenness and considerable ability and my thanks are due to him for several proposals and cordial support in working the contract traverse scheme.

Lieutenant L. C. Thuillier, I.A., has been attached to the Traverse section for the last six weeks of the year, with a view to his learning the details of traverse work.

Mr. A. W. Smart has maintained his previous reputation, and I cannot speak too highly of his keenness and ability. The Deputy Surveyor-General who visited Mr. Smart's office during recess has also expressed his high commendation of his work.

Mr. C. S. Kraal completed a large programme on the Bhagalpur district satisfactorily, but has been hampered by bad health and was compelled to take leave.

Mr. N. Bedford in charge of the Backerganj cadastral survey deserves special mention. Mr. Bedford is a very capable officer and has done very good work in a very difficult situation.

The remaining officers in charge of sections, viz., Messrs. T. W. Babonau, W. Skilling, C. S. Gasper, C. H. C. Johnson, P. L. Causley, and H. W. Biggie have all worked very satisfactorily.

Mr. E. F. Berkeley in charge of the Bengal Drawing Office has done very good work during the year under report.

Mr. R. B. Smart has started and carried on the Calcutta Suburbs survey to my complete satisfaction.

The assistants and supervisors have all worked well with one or two exceptions.

The names of the members of the native establishment who deserve special mention will be reported to the Board in a separate communication.

I have the honour to be,

SIR,

Your most obedient servant,

R. T. CRICHTON, MAJOR, I.A.,

Superintendent, Provincial Surveys in Bengal.

APPENDIX I—PART A.

Summary of the outturn of work of the Survey Parties in Bengal, for 1902-1903.

DISTRICT.	TRAVERSING.					CADASTRAL SURVEY.				RECORD-WRITING.		TOPOGRAPHICAL SURVEY.
	Number of villages.	Linear miles of chaining.	Number of stations at which the theodolite was set up.	Number of Azimuths.	Number of sub-traverses.	Number of villages.	Fields.	Linear miles of test survey.	Number of sheets.	Number of villages.	Fields.	Number of villages.
1	2	3	4	5	6	7	8	9	10	11	12	13
Government Estates.												
Monghyr	...	...	...	...	...	2	79	Nil	3	2	79	...
Hazaribagh (Koderma) ...	127	288	2,063	23	89	...	...	...	...	...	...	...
Private Estates.												
Bhagalpur	441	2,221	11,912	59	731	985	1,966,842	7,806	2,048	960	1,952,689	...
Purnea	(*b*)1,182	4,611	24,324	132	1,160	...	...	...	...	...	...	...
Rangpur	(*c*)254	598	4,855	40	137	...	...	...	...	...	...	...
Backergunge	890	3,134	24,927	120	806	390	369,790	1,971	938	408	423,210	...
Midnapur	1,766	2,834	21,037	125	306	...	...	...	...	...	...	...
Sonthal Parganas (Mauzawar)	1,769	7,353	39,534	272	749	...	...	...	...	...	...	...
Ditto (for trijunction only.)	2,135				...	...	...	...	...	...	...	...
Ranchi	758	3,176	22,944	152	1,049	422	346,072	1,942	937	282	224,294	...
Miscellaneous.												
Bhagalpur (Municipality) ...	(*a*)14	97	2,413	2	232	(*d*)...	...	...	...	...	...	...
Darbhanga (Rosera Municipality.)	(*a*)7	17	713	2	83	(*d*)...	...	...	...	...	...	...
Monghyr Government Estate ...	...	...	...	...	...	...	...	...	...	...	...	...
Ditto (Relaying Darobast boundary.)	1	20	83	3	Nil	...	...	...	...	...	...	...
Shahabad (Taufir-Bhedia) ...	4	15	81	Nil	4	...	...	...	...	...	...	...
Ditto (Surajpura Estate)...	3	8	50	Nil	1	...	...	...	...	...	...	...
Ditto (Umarpur Deara) ...	1	28	82	Nil	4	...	...	...	...	...	...	...
Purnea (Matiari Thana) ..	9	90	451	1	27	9	9,317	69	23	9	9,317	...
Calcutta Suburbs	(*d*)...	234	5,818	...	...	...	...	...	...	...	...	...
Total ...	9,361	24,724	161,287	931	5,378	1,808	2,692,100	11,788	3,949	1,661	2,609,589	...

(*a*) Blocks.
(*b*) Includes 61 portions of villages.
(*c*) Ditto 24 ditto.
(*d*) Final figures will be given in next year's report.

R. T. CRICHTON, MAJOR, I.A.,

Superintendent of Provincial Surveys in Bengal.

APPENDIX I—PART B.

Statement of Outturn and Cost-rates.

DISTRICT AND ESTATE.	Description of work.	Estimated area to be dealt with in square miles.	Year of inception of operation.	AREA SURVEYED IN SQUARE MILES. During the year under report.	AREA SURVEYED IN SQUARE MILES. Total including previous years.	COST-RATE PER SQUARE MILE. During the year under report.	COST-RATE PER SQUARE MILE. From beginning to end of the year under report.	Balance of area remaining to be surveyed.	Estimated cost of completing the area in column 9.	Estimated final cost rate per square mile.	REMARKS. (Explanation of unusually high expenditure.)
1	2	3	4	5	6	7	8	9	10	11	12
Government Estates.						Rs.	Rs.		Rs.	Rs.	
Hazaribagh (Koderma)...	Traverse	120	1902	120	120	35·0	35·0	...	...	35·0	Small and detached area.
Monghyr	Cadastral	12	1901	1	12	78·0	69·6	...	...	69·6	
	Records	12	1901	1	12	46·0	46·3	...	...	46·3	
Private Estates.											
Bhagalpur	Traverse	2,208	1901	572	1,667	26·6	26·3	631	16,700	26·4	
	Cadastral	2,098	1902	1,622	1,622	61·3	61·3	476	25,000	61·0	
	Records	2,098	1902	1,594	1,594	71·2	71·2	504	36,000	71·0	Small field.
Purnea	Traverse	4,727	1900	1,189	1,919	24·3	29·6	2,808	79,000	28·7	
Rangpur	Do.	88	1902	88	88	57·3	57·3	...	...	57·3	Small, detached and scattered area.
Backergunge	Do.	2,975	1900	1,027 (a)	2,325 (a)	43·6	58·1	650	30,000	55·4	Labour expensive.
	Cadastral	2,975	1901	574	1,176	114·7	155·3	1,789	214,000	133·3	Labour expensive.
	Records	2,975	1901	567	1,103	53·0	80·6	1,872	112,000	67·5	
Midnapur	Traverse	690	1903	655	655	38·5	38·5	35	1,400	38·5	Labour expensive—Scattered area
Sonthal Parganas...	Do. Mauzawar	3,869	1898	861	3,867	28·3	42·1	...	...	42·1	
	Do. Tri-junction	1,541	1901	1,298	1,541	14·1	13·0	...	...	13·0	
Ranchi	Do.	1,846	1901	1,001	1,432	28·9	38·4	414	12,400	36·5	
	Cadastral	1,846	1902	617	617	61·7	61·7	1,229	86,000	67·2	
	Records	1,846	1902	437	437	32·3	32·3	1,409	84,500	53·4	
Miscellaneous.											
Bhagalpur Municipality	Traverse	9	1903	9	9	...	...	...	...	...	
Darbhanga (Rosera Municipality) ...	Do.	1	1903	1	1	...	...	...	...	...	
	Cadastral	1	1903	...	...	...	...	1	500	...	
Monghyr: Mauza Darobust	Traverse	20	1903	20	20	...	...	...	...	...	
Shahabad: Taufir Bhedia	Do.	4	1901	2	2	...	...	2	500	...	
Ditto Surajpur Estate	Do.	1	1902	1	1	...	...	...	...	...	
Ditto Umarpur Deara	Do.	7	1901	7	7	...	...	...	...	...	
Purnea: Matiari Thana...	Traverse	21	1902	21	21	29·8	29·8	...	...	29·8	
	Cadastral	21	1903	21	21	50·0	50·0	...	...	50·0	
	Records	21	1903	21	21	55·0	55·0	...	...	55·0	
Calcutta Suburbs Survey	Traverse	12	1903	12	12	(b)	(b)	...	168,380	...	
	Cadastral	12	1903	3	3	(c)	(c)	9		...	
Total and average columns 7, 8, and 11.	Traverse	18,229	...	6,884	13,689	(d) 31·7	(d) 40·1	4,540	...	...	
	Cadastral	6,965	...	2,838	3,451	72·2	93·4	3,514	...	...	
	Records	6,952	..	2,620	3,167	60·6	68·9	3,785	...	...	

(a) Includes 131 square miles of water area.
(b) Not final as the area is not complete in sub-traverses yet.
(c) Not final as work is in a partial state of completion.
(d) Excludes rate for Tri-junction traversing.

R. T. CRICHTON, MAJOR, I.A.,

Superintendent of Provincial Surveys in Bengal.

APPENDIX II.

Statement of sums expended.

District, &c.	Description of work.	Expenditure incurred during the year under report.				Total expenditure from inception to end of the year under report.			
		Actual (direct) cost.	Share of Superintendent, Provincial Surveys' pay and cost of his office.	Four per cent. charge for instruments.	Total.	Actual (direct) cost.	Share of Superintendent, Provincial Surveys' pay and cost of his office.	Four per cent. charge for instruments.	Total.
1	2	3	4	5	6	7	8	9	10
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Government Estates.									
Hazaribagh (Koderma)	Traverse	3,900	300	...	4,200	3,900	300	...	4,200
Monghyr	Cadastral	70	5	3	78	756	47	32	835
	Records	41	3	2	46	504	31	21	556
Private Estates.									
Bhagalpur	Traverse	13,613	999	584	15,196	39,579	2,585	1,686	43,850
	Cadastral	89,139	6,540	3,827	99,506	89,139	6,540	3,827	99,506
	Records	1,01,676	7,458	4,365	1,13,499	1,01,676	7,458	4,365	1,13,499
Purnea	Traverse	25,841	1,897	1,109	28,847	50,650	3,995	2,185	56,830
Rangpur	Do.	4,700	345	...	5,045	4,700	345	...	5,045
	Do.	24,973	2,567	1,501	39,041	1,14,229	8,360	4,902	1,27,491
Backergunge	Cadastral	59,025	4,330	2,534	65,889	1,64,659	10,939	7,023	1,82,621
	Records	26,333	1,976	1,156	30,065	80,095	5,375	3,419	88,889
Midnapur	Traverse	23,466	1,723	...	25,189	23,466	1,723	...	25,189
Sonthal Parganas—Mauzawar ...	Do.	22,667	1,663	...	24,330	1,44,083	14,817	4,039	1,62,939
Ditto Trijunction ...	Do.	17,095	1,255	...	18,350	18,620	1,348	..	19,968
	Do.	26,960	1,965	...	28,925	50,590	3,408	1,003	55,001
Ranchi	Cadastral	34,084	2,502	1,463	38,049	34,084	2,502	1,463	38,049
	Records	12,640	927	543	14,110	12,640	927	543	14,110
Miscellaneous.									
Bhagalpur Municipality	Traverse	1,300	95	56	1,451	1,300	95	56	1,451
	Cadastral	24	2	1	27	24	2	1	27
Darbhanga (Rosera Municipality) ...	Traverse	474	35	20	529	474	35	20	529
	Cadastral	626	46	27	699	626	46	27	699
Monghyr (Belaying Darobast boundary.)	Traverse	418	30	18	466	418	30	18	466
Shahabad (Taufir Bhedia)	Do.	280	20	12	312	424	29	18	471
Ditto (Surajpura Estate)... ...	Do.	110	8	5	123	110	8	5	128
Ditto (Umarpur Diara)	Do.	420	30	18	468	683	46	29	758
	Do.	560	41	24	625	560	41	24	625
Purnea (Matiari Thana)	Cadastral	932	68	40	1,040	932	68	40	1,040
	Records	1,031	76	44	1,151	1,031	76	44	1,151
Calcutta Suburbs Survey	Traverse	8,418	617	...	9,035	8,418	617	...	9,035
	Cadastral	20,586	1,511	...	22,097	20,586	1,511	...	22,097
Badars (Monghyr)	Do.	2,864	209	122	3,186	5,001	332	214	5,547
Arrears (Do.)	Do.	366	37	17	420	1,180	87	51	1,318
Backergunge Arrears	Do.	20,151	1,480	865	22,496	20,151	1,480	865	22,496
Ditto Badars	Do.	583	40	25	648	583	40	25	648
Darbhanga, Arrears	Do.	21	2	1	24	6,844	420	291	7,555
Ditto Badars	Do.	392	28	17	437	2,158	135	92	2,385
Purnea (Surajpur) Arrears	Do.	3,460	254	148	3,862	3,460	254	148	3,862
Ditto Badars	Do.	4,466	329	192	4,987	4,466	329	192	4,987
Darjeeling—Kalimpong	Do.	1,092	79	47	1,218	1,092	79	47	1,218
Monghyr—Ratanpur Estate	Traverse	28	2	1	31	28	2	1	31
Malda—Government Estates	Do.	209	15	9	233	209	15	9	233
Ranchi—Training School	Cadastral	861	63	37	961	861	63	37	961
Do. Arrears	Traverse	60	4	2	66	60	4	2	66
Singhbhum—Ranchi (boundary) ...	Do.	178	13	8	199	178	13	8	199
Ditto Porahat	Do.	394	29	...	423	394	29	...	423
	Do.	1,86,064	13,653	3,367	2,03,084	4,63,073	37,845	14,005	5,14,923
Total ...	Cadastral	2,33,742	17,516	9,366	2,65,624	3,56,602	24,874	14,375	3,95,851
	Records	1,42,321	10,440	6,110	1,58,871	1,95,946	13,867	8,392	2,18,205
	Standard maps ...	13,402	985	...	14,387	28,261	2,037	...	30,298
	Thana maps ...	2,309	169	...	2,478	3,631	267	...	3,898
Bengal Drawing Office	Reproduction of village maps.	17,856	1,311	...	19,167	72,816	5,256	...	78,072
	Orissa Badars ...	1,671	123	...	1,794	5,754	450	...	6,204
	Bihar Badars ...	2,310	170	...	2,480	5,372	382	...	5,754
Grand Total ...		6,04,675	44,367	18,843	6,67,885	11,31,455	84,978	36,772	12,53,205

R. T. Crichton, Major, I.A.,

Superintendent of Provincial Surveys, Bengal.

B. S. Press—1977J—340—4-1-1904—C. & W. A. McI.

REVENUE DEPARTMENT.

LAND REVENUE.

CALCUTTA, THE 29TH FEBRUARY, 1904.

RESOLUTION—No. 1299

READ—

Letter No. 558A., dated the 15th January, 1904, from the Board of Revenue, submitting, with a note, the Survey and Settlement Reports for the year ending the 30th September, 1903.

The Survey and Settlement reports for the year ending the 30th September, 1903, with their appendices, have been prepared generally in accordance with the orders of Government.

2. Survey and settlement operations were in progress during the year in eighteen districts contained in eight of the nine Divisions of this Province. The programme, which was considerably larger than in the previous year, has been generally carried out; while, in the few cases in which deficiencies occurred, the reasons given for the failures are satisfactory. The area covered by the traverse survey parties was 6,884 square miles, and was 2,713 square miles in excess of that dealt with in the previous year. Cadastral survey operations extended over 3,719 square miles, as against 3,357 square miles in the year 1901-02. A record-of-rights has now been framed in respect of 32,482 out of a total area of 151,185 square miles of British territory in the Province.

3. The Lieutenant-Governor joins with the Board in congratulating Major Crichton, Superintendent of Provincial Surveys, upon the marked success which has attended the various measures of economy which he has introduced in the working of his Department during the year. It is noticeable that in Backergunge, where there are peculiar difficulties to contend with, the cost per square mile of traverse survey amounted to Rs. 43·6, as against Rs. 61·9 in the previous year; and that the cost of cadastral survey, with preliminary records, was Rs. 167·7, as compared with Rs. 273·3 in the year 1901-02. In Ranchi, where, owing to the poverty of the country and the people, it is specially important that the work should be done as cheaply as possible, it is very satisfactory that the traverse survey was carried out at a cost of only Rs. 28·9 per square mile, as against Rs. 60·5 in the year 1901-02; while the cost of cadastral survey and initial record-writing was only Rs. 94 per square mile. In Purnea, the cost of traverse survey was only Rs. 24·3 per square mile; and the Lieutenant-Governor notices with pleasure that the care with which the preliminary demarcation was supervised by Messrs. Pyne and Wodschow, on behalf of the Darbhanga Raj, was one of the causes which contributed to this good result.

4. In paragraph 14 of his report, the Director has stated that kanungos, and, sometimes, persons not in the employment of Government, are now being largely employed on record-writing and as Assistant Settlement Officers. He observes that the cost of the operations will, in this manner, be materially reduced; but that he fears that efficiency may be impaired. In commenting on these remarks, the Board of Revenue deprecate the prosecution of economy in the direction of cheapening the supervising agency, where there is any danger that such economy will affect the efficiency of the work. A separate communication will shortly be addressed to the Board on the subject of the subordinate agency employed; and it will suffice to say here that the Lieutenant-Governor fully concurs in the opinion thus expressed by them. The question of effecting economy in survey and settlement operations was fully discussed in the year 1902; and, in reporting to the Government of India the measures

which it was proposed to take in order to attain this object, the late Lieutenant-Governor, Sir James Bourdillon, held that, in no circumstances, should expenditure be curtailed in such a way as to render the record less trustworthy than it has hitherto been. With this view Sir Andrew Fraser is in entire agreement.

5. The question of *diara* surveys, which was alluded to in paragraph 7 of the Resolution of this Government reviewing the Survey and Settlement reports for the year ending the 30th September, 1902, is still under the consideration of the Board; but, as indicated in paragraph 11 of the present Settlement report, the matter will shortly be submitted by them for decision.

6. The settlement of rents in the Damin-i-Koh Government Estate in the Sonthal Parganas was completed during the year; the result being that the rents of the last settlement were enhanced by 50 *per cent.* for the first five years, and by 62 *per cent.* for the remaining period of the new settlement. Under a declaration made by Government in the year 1823, the lands held by the Paharias, which lie within the limits of this Estate, cannot be assessed to rent without their consent; and hence no compulsion has been put upon these people to apply for settlement. The hillmen have, however, begun to realize that settlement proceedings will have the effect of protecting them from encroachments by the Sonthals; and it is satisfactory to learn that 111 Paharia villages were settled during the year on voluntary application.

7. The Lieutenant-Governor has noticed with special satisfaction the remarks, quoted below, which have been recorded by the Settlement Officer of Ranchi as to the attitude of the Mundas towards the operations which are being conducted in that district:—

"So far, the progress of the settlement appears to have aroused no unhealthy excitement amongst the Mundas of the areas dealt with, whose attitude has, on the whole, been friendly. They appear to believe that Government is making a serious effort to befriend them; and, in turn, they have willingly assisted the work in supplying free labour for cadastral survey and record-writing, and no difficulty has been found in obtaining carriers at cheap rates. This was specially the case in the Mundari *khuntkatti* area, where the people were deeply interested in the fate of the Bill which dealt with the preservation of their rights. The passing of the Chota Nagpur Tenancy (Amendment) Act, V (B.C.), of 1903, appears to have caused great satisfaction to them."

The Lieutenant-Governor has just received an address from the residents of the Ranchi district, asking that the survey and settlement operations should be extended to the whole district. The results in deciding land disputes and preventing litigation are appreciated. It is also satisfactory to observe that the inhabitants of pargana Surjapur, in Purnea, were very favourably disposed towards the operations which were undertaken there for the purpose of settling disputes between landlords and tenants; and that the people holding lands in adjoining areas were most solicitous in their enquiries as to the time when the operations would be extended beyond the pargana referred to.

8. The statistics relating to the mutation offices established under the Land Records Maintenance Act, III (B.C.) of 1895, emphasise the conclusion, previously arrived at, that the Act has proved a failure. Schemes for the maintenance of the records in North Bihar, Orissa and Chittagong have been submitted to the Government of India, and are now under the consideration of that Government. The present Settlement report furnishes indications of improvement in the record of mutations of names in Government and Wards' Estates. In some cases, however, the work is still unsatisfactory; and the Board are requested to pay continued attention to this important subject.

9. It is satisfactory to observe, from Chapter V of the Director's report, that the settlement records and maps are now more largely utilised in general district administration. As observed by the Board, the work of maintaining boundary marks on an effectual system has only just begun; and the progress made cannot yet be profitably criticised.

10. In conclusion, the Lieutenant-Governor has much pleasure in acknowledging the services of the various officers, whose work has been brought to notice in the reports under review, and in the Board's note thereon. The thanks of Government are due to Messrs. Allen and Maddox and to Major Crichton for their efficient management of the Departments under their charge. Mr. Beatson-Bell has done admirable work in the district of Backergunge in the face of exceptional difficulties; while Messrs. McPherson, Lister, Coupland, and Taylor are specially commended for the ability and energy

displayed by them in dealing with the important operations entrusted to them.

ORDER.—Ordered that this Resolution be published in the *Calcutta Gazette*, and that a copy of it, with copies of the two reports, be submitted to the Government of India.

By order of the Lieutenant-Governor of Bengal,

A. EARLE,
Secretary to the Govt. of Bengal.

No. 1300.

COPY, with a copy of the Survey report, forwarded to the Deputy Surveyor-General in charge, Revenue Branch, Survey of India, for information.

No. 1301.

COPY, with a copy of the Settlement report, forwarded to the Appointment Department of this Government, for information, with special reference to paragraph 10 above.

No. 1302.

COPY forwarded to the Secretary to the Board of Revenue, Land Revenue Department, for the information of the Board.

By order of the Lieutenant-Governor of Bengal,

L. S. S. O'MALLEY,
Unaer-Secretary to the Govt. of Bengal.

CALCUTTA;
REVENUE DEPT.—*Land Revenue,*
The 29th February 1904.

B. S. Press—5575C—986—4-3-1904—T. N. R.

ANNUAL REPORT

ON THE

SURVEY OPERATIONS IN BENGAL

DURING THE YEAR

1903-1904.

From 1st October 1903 to 30th September 1904.

LIBRARY
OF THE
BOMBAY
BRANCH
OF THE
ROYAL ASIATIC SOCIETY.

Calcutta:
PRINTED AT THE BENGAL SECRETARIAT PRESS.
1905.

Published at the BENGAL SECRETARIAT BOOK DEPÔT,
Writers' Buildings, Calcutta.

OFFICIAL AGENTS.

In India—

MESSRS. THACKER, SPINK & Co., Calcutta and Simla.
MESSRS. NEWMAN & Co., Calcutta.
MESSRS. HIGGINBOTHAM & Co., Madras.
MESSRS. THACKER & Co., LD., Bombay.
MESSRS. A. J. COMBRIDGE & Co., Bombay.
THE SUPERINTENDENT, AMERICAN BAPTIST MISSION PRESS, Rangoon.
MRS. RADHABAI ATMARAM SAGOON, Bombay.
MESSRS. R. CAMBRAY & Co., Calcutta.
RAI SAHIB M. GULAB SINGH & SONS, Proprietors of the Mufid-i-am Press, Lahore, Punjab.
MESSRS. S. K. LAHIRI & Co., Printers and Booksellers, College Street, Calcutta.
MESSRS. V. KALYANARAMA IYER & Co., Booksellers, *&c.*, Madras.
MESSRS. D. B. TARAPOREVALA, SONS & Co., Booksellers, Bombay.
MESSRS. G. A. NATESON & Co., Madras.
MR. N. B. MATHUR, Superintendent, Nazair Kanum Hind Press, Allahabad.
THE CALCUTTA SCHOOL BOOK SOCIETY.

In England—

MR. E. A. ARNOLD, 41 & 43 Maddox Street, Bond Street, London, W.
MESSRS. CONSTABLE & Co., 16 James Street, Haymarket, London, W.
MESSRS. KEGAN PAUL, TRENCH, TRÜBNER & Co., Charing Cross Road, London.
MR. B. ALFRED QUARITCH, 15 Piccadilly, London.
MESSRS. P. S. KING & SON, 2 & 4 Great Smith Street, Westminster, London.
MESSRS. H. S. KING & Co., 65 Cornhill, London.
MR. B. H. BLACKWELL, 50-51 Broad Street, Oxford.
MESSRS. DEIGHTON BELL & Co., Cambridge.

On the Continent—

MESSRS. R. FRIEDLÄNDER & SOHN, Berlin, N. W., Carlstrasse, 11.
MR. OTTO HARRASSOWITZ, Leipzig.
MR. KARL HIERSEMANN, Leipzig.
MR. ERNEST LEROUX, 28 Rue Bonaparte, Paris.
MR. MARTINUS NIJHOFF, The Hague.

[Maximum limit, 24 pages, excluding appendices.]

INDEX TO CONTENTS.

CHAPTER I.

	Page.
GENERAL REMARKS ON THE PROVINCIAL SURVEYS	1

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND RECORDS OF RIGHTS IN TEMPORARILY-SETTLED AND GOVERNMENT ESTATES UNDER SETTLEMENTS OF RENTS AND LAND REVENUE.

BURDWAN DIVISION	MIDNAPORE DISTRICT	Traverse Survey . . .	2
	„ „	Cadastral „ . . .	3

PART II.—REPORTS ON SURVEYS AND RECORDS OF RIGHTS IN PRIVATE ESTATES.

BHAGALPUR DIVISION	BHAGALPUR DISTRICT	Traverse Survey . . .	4
	„ „	Cadastral „ . . .	4
	„ „	Topographical „ . . .	5
	PURNEA „	Traverse „ . . .	6
	„ „	Cadastral „ . . .	6
	„ „	Topographical „ . . .	7
DACCA „ ...	BACKERGUNGE „	Traverse „ . . .	7
	„ „	Cadastral „ . . .	8
CHOTA NAGPUR „	RANCHI „	Traverse „ . . .	8
	„ „	Cadastral „ . . .	9
	SINGHBHUM „	Traverse „ . . .	10

PART III.—REPORTS ON MISCELLANEOUS, SURVEYS.

PRESIDENCY DIVISION—24-PARGANAS—Calcutta Suburbs Survey . . .			10
BHAGALPUR „	BHAGALPUR DISTRICT	Bhagalpur Municipality . .	11
	MONGHYR „	Monghyr „ . . .	11
PATNA „	SHAHABAD „	Umarpur Diara . . .	12
	CHAMPARAN „	Karaulia Bhasauli . . .	12
BHAGALPUR „	MONGHYR „	Mauza Darabust . . .	12
PATNA „	PATNA „	„ Ghora urf Katora . .	12
	DARBHANGA „	„ Chaparsan . . .	12
	„ „	Rosera Municipality . . .	12
CHOTA NAGPUR „	„ „	Udaipur State	13

PART IV.—REPORT ON THE BENGAL DRAWING OFFICE.

STANDARD AND DISTRICT MAPPING SECTION	13
THANA MAPPING SECTION	14
REPRODUCTION OF VILLAGE MAPS	14
BIHAR BADAR SECTION	16
ORISSA „ „	16
MAP RECORD „	16

CHAPTER III.

	Page
PART I.—TOURS OF SUPERINTENDENT OF PROVINCIAL SURVEYS . . .	17
PART II.—SERVICES OF OFFICERS	17

LIST OF APPENDICES.

APPENDIX I.—PART A.—SUMMARY OF OUTTURN OF WORK	19
PART B.—STATEMENT OF OUTTURN AND COST RATES . . .	20
„ *II.*—EXPENDITURE STATEMENT	21

LIST OF INDEX MAPS.

PROVINCE OF BENGAL	*To face page* 1
MIDNAPORE DISTRICT	„ „ 2
BHAGALPUR „	„ „ 4
PURNEA „	„ „ 6
BACKERGUNGE „	„ „ 7
RANCHI „	„ „ 8
SINGHBHUM „	„ „ 10
CITY OF CALCUTTA	„ „ 10

ANNUAL REPORT OF

THE SUPERINTENDENT OF PROVINCIAL SURVEYS, BENGAL,

ON THE

SURVEY AND RECORD-OF-RIGHTS OPERATIONS IN BENGAL

DURING THE YEAR 1903-1904.

No. $\frac{3654}{R\text{-}7—124}$.

FROM MAJOR R. T. CRICHTON, I.A.,

Superintendent of Provincial Surveys in Bengal,

TO THE SECRETARY TO THE BOARD OF REVENUE, L. P.

Dated Dinapore, the 30th November 1904.

SIR,

I HAVE the honour to submit the report on the survey operations in Bengal during the past survey year, namely, from 1st October 1903 to 30th September 1904.

2. I have been in charge for the whole period under report except for five weeks, viz., from 1st October until 9th November 1903, when Captain F. C. Hirst, IA.., officiated for me.

CHAPTER I.

GENERAL REMARKS.

3. The outturn of the year, namely, 5,028 square miles of traverse survey, 4,054 square miles of cadastral survey, 4,065 square miles of record-writing and 463 square miles of topographical survey is very considerably the largest outturn of work accomplished by the Bengal Surveys since their creation in 1891-92. The full programme of the year has been worked up to in every respect except for small failures in districts Ranchi and Midnapore, which are explained in full on pages 9 and 3, and these failures are more than counterbalanced by excess areas obtained elsewhere.

Establishments.

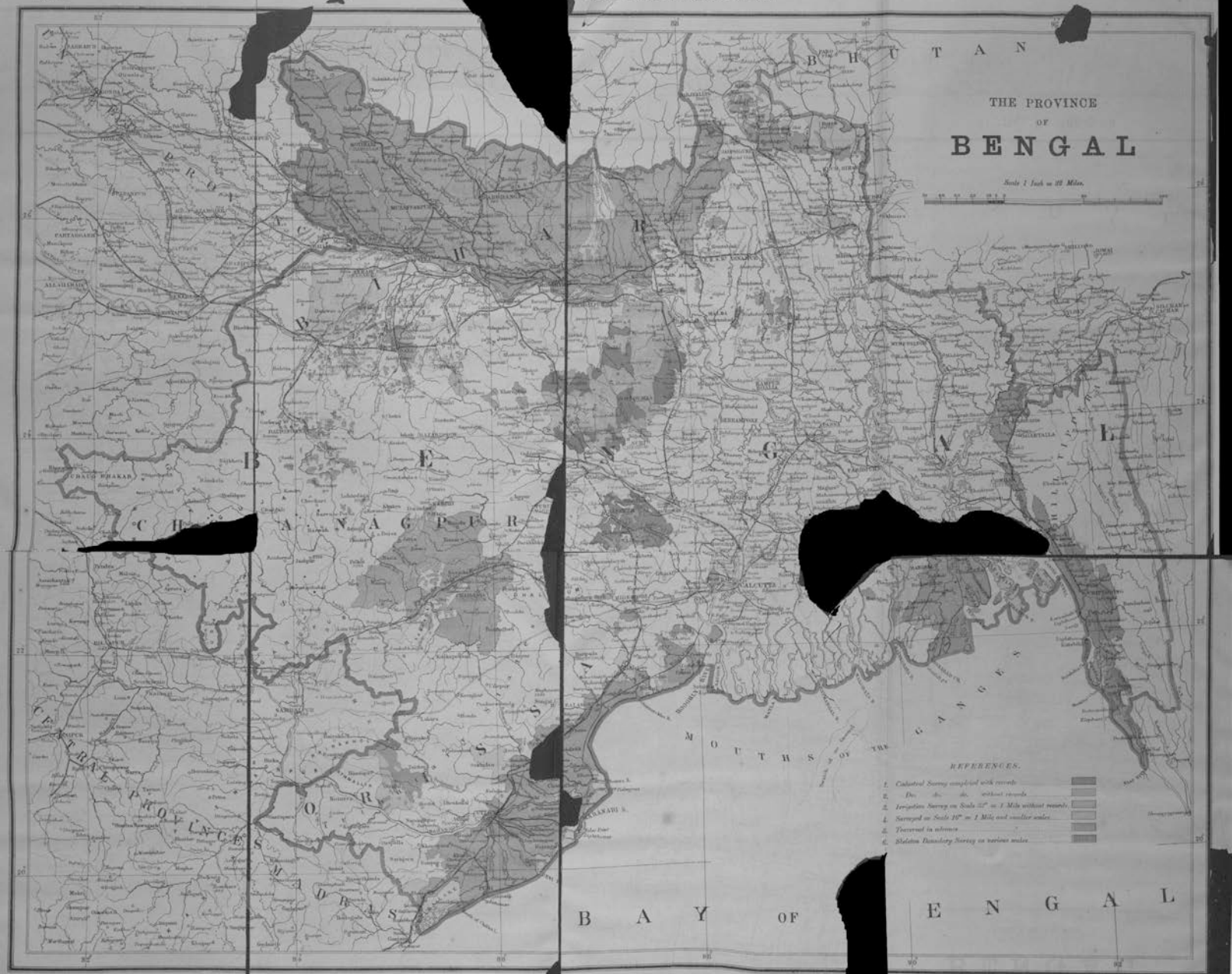
4. The necessary extra establishments were obtained by establishing training classes at Midnapore and Ranchi.

Changes during the year.

5. A proposal, of which the credit is due to Captain Hirst, to traverse and topographically survey extensive "diara" tracts on the 4-inch-to-the-mile scale instead of the usual 16-inch scale, was approved by the Board with the addition that village boundaries in such tracts need not be demarcated and surveyed on the ground. This has been given effect to during the year under

GAL SURVEY.

TRAVERSE SURVEYS IN THE PROVINCE OF BENGAL.


THE PROVINCE
OF
BENGAL
Scale 1 Inch to 16 Miles.
BHUTAN
BENGAL
BAY OF
MOUTHS OF THE GANGES
REFERENCES.
1. Cadastral Survey completed with records
2. Do. do. do. without records
3. Irrigation Survey on Scale 32" to 1 Mile without records
4. Surveyed on Scale 16" to 1 Mile and smaller scales
5. Traverse in advance
6. Skeleton Boundary Survey on various scales

Reg. No. 765-S. 04.

report. The advantages claimed are cheapness and saving of a large number of unnecessary boundary disputes in constantly changing "diara" tracts where the inhabitants cannot be expected to know and properly demarcate their boundaries. These advantages have been attained, but there is still room for improvement in the cost rates which were not as low as had been expected owing to the establishments being new to this sort of work.

6. With the approval of the Board the system of reproducing village maps by the Vandyke process has been extended to the copies of maps required by the Settlement Department at the attestation stage. Therefore during the year under report, each cadastral camp instead of supplying the vellum traces, which had formerly been made for attestation purposes, sent its cadastral sheets to the Bengal Drawing Office, where, owing to the fact that the original maps had been drawn on the new transparent paper (*vide* paragraph 5 of last year's report), it was possible to reproduce copies direct. The sheets were returned as soon as done with, along with two or three copies of each map on bank-post paper. These bank-post copies have been made over to the Settlement Officers who can, instead of making numerous small traces for their surveyor "munsarims," have any necessary corrections made on a spare copy, without in any way interfering with the progress of attestation. This procedure is considerably cheaper than the old vellum traces, as it does away with all tracing and also, as the process is purely mechanical, with examination. Owing to the fact that the Bengal Drawing Office could not be supplied with the necessary extra presses and other accessory plant in time, it was impossible to reproduce all the season's sheets, but by far the greater number have been so reproduced. On the whole, considering that the original sheets were inked up by the "amins" themselves, the reproduced copies were very fair. Detailed rules to ensure evenness in inking and the drawing of the sheets in a style more suitable for reproduction have been issued and with a thicker and tougher bank-post paper this procedure should be a complete success.

7. In paragraph 6 of last year's report reference was made to a trial in carrying out traverse work on contract. The system of contract payments has been further extended during the year as far as regards a considerable part of the computing work in office and has worked well. Unfortunately, owing to the very high pressure under which the traverse camps were working during the field season, it was not found possible to continue the experiments in the field and they were accordingly postponed until next year.

8. During the year, the Board have published detailed rules for the preservation of boundary marks and steps have been taken at the Bengal Drawing Office and in the field parties to compile index maps showing the nature and positions of all such marks.

9. In Part IV of Chapter II of this report the large increase in reproduction work is reported on in detail. It will be noted that copies of a village map can now be provided at a cost of one anna four pies per copy.

Badar Establishments.

10. Settlement *badars* have as heretofore been dealt with by the field parties concerned. All this work is absolutely up to date.

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND RECORDS-OF-RIGHTS IN TEMPORARILY SETTLED AND GOVERNMENT ESTATES UNDER SETTLEMENTS OF RENTS AND LAND REVENUE.

MAJOR SETTLEMENTS.

District Midnapore.

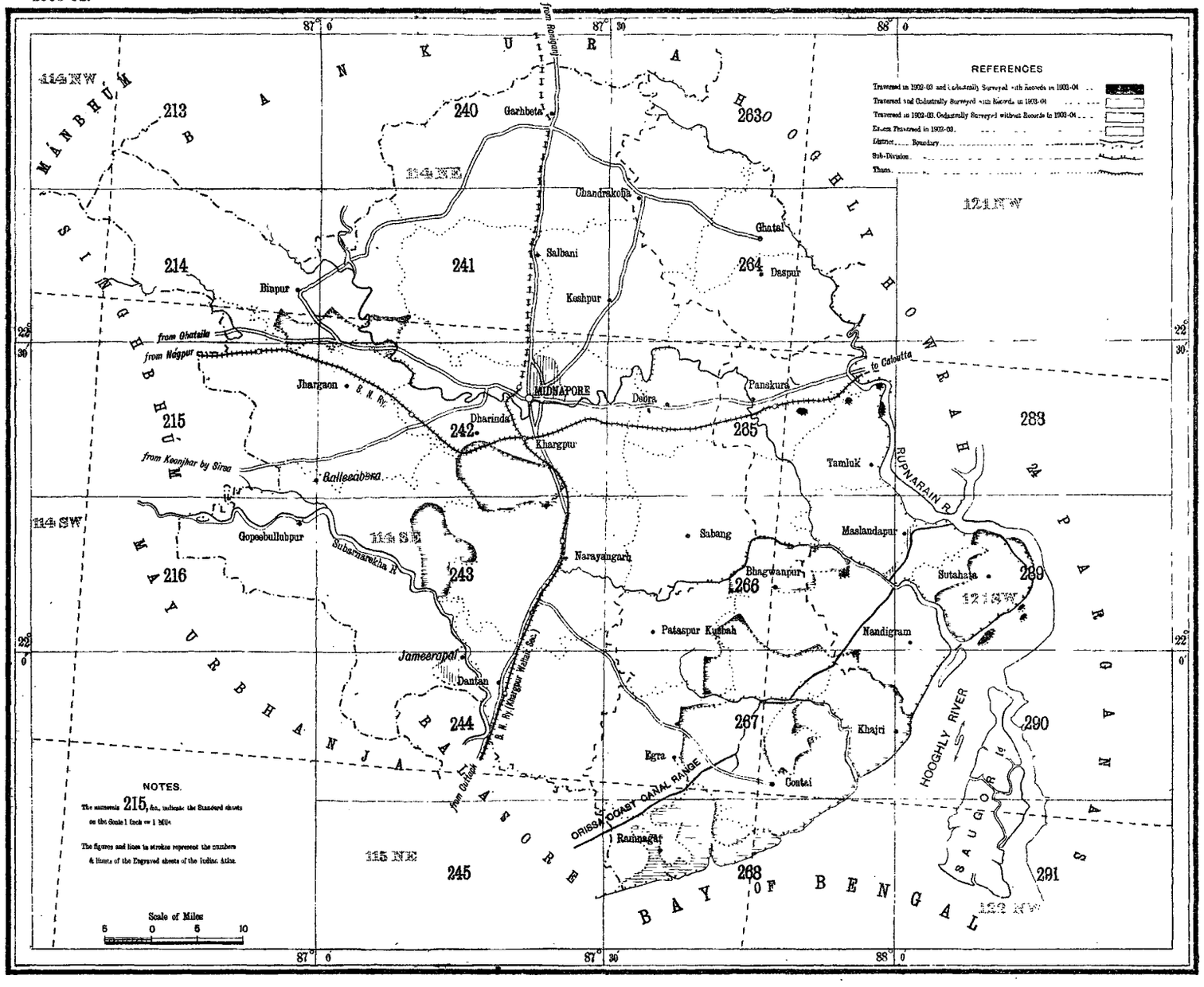
Traverse Survey.

11. The traverse operations in this district were confined to the completion of a small amount of arrears work and to the Jamirapal estate which was added to the programme at a later date.

BENGAL SURVEY.

1903-04.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT MIDNAPORE.



No. 624, S. I.—Dec. 04.—525.

Reg. No. 966-S. 04.

The outturn was 22 square miles. The expenditure was Rs. 1,855, which gives a cost rate of Rs. 84·3 per square mile. The work was undertaken by the Backergunge traverse detachment and low cost rates cannot be expected for such small detached areas.

Cadastral Survey.

12. The programme in this district consisted of the cadastral survey and record-writing of the Jalamutha, Majnamutha, Balarampur and other scattered estates which had been traversed during the previous season and also of the 22 square miles traversed during the same season.

Considerable doubts existed as to what the actual area notified for survey would prove to be. According to the traverse figures of 655 square miles during 1902-03 and the 22 square miles of the season under report, the whole area appeared to be 677 square miles. The District Officer, however, estimated it to be 550 square miles. The actual outturns accomplished are 621 square miles of survey and 486 square miles of record-writing. The 621 square miles surveyed, however, contain a certain amount of permanently-settled and revenue-free lands which are not included in the notification for survey. It was impossible to avoid such small scattered areas as were included within the peripheries of villages under survey, but instructions were issued that blocks of 10 acres and over were not to be surveyed in detail. The area of such blocks is reported to aggregate 28 square miles and as 21 square miles still remain to complete the notified programme, it is apparent that the whole area for survey is 613 square miles. In order to undertake the survey the Sonthal Parganas traverse detachment which had completed its programme was converted into a cadastral survey detachment and a training class for local amins was opened at Midnapore on 1st September 1903. Out of 146 men who went through the course, only 93 qualified and the remainder of the establishment was made up of 126 Bengali and 102 trained up-country "amins."

The survey was checked by 2,845 linear miles of test surveys, which gives an average of 4 6 linear miles of test survey to each square mile of detail. The entries against 100,840 plots were checked by the survey staff, which gives an average of 24 per cent. on the total number of plots *khanapuried.*

The nature of the country in the Sadar subdivision was undulating with a considerable amount of jungle and waste lands, but in the Contai and Tamluk subdivisions was very low-lying. In considerable portions of the low-lying tracts work could not be commenced until the end of March owing to the presence of water. The survey rules for Backergunge were, with a few modifications, adopted for Midnapore. The local tenures were found to be very intricate and special rules were compiled for the record-writing. Copies of the Collectorate registers were supplied to the Survey Department and formed the basis of the new *khewats.* There were 164 boundary disputes, of which 148 were decided by the Settlement Department. As the Settlement Officer was anxious to start the attestation of the scattered blocks in the Sadar subdivision, a special staff was engaged to complete the statistics of parganas Kalianpur, Balarampur, Dipakiar Chand and Jamirapal and the records were made over to him at an early date.

Great difficulty was experienced in dealing with the recess work, as a large number of the local men absconded and untrained men had to be engaged to fill their places, but as arrangements have been made with the Settlement Officer, there is no danger of the attestation programme suffering.

The attitude of the inhabitants was extremely apathetic during the survey stage, but more interest was exhibited as soon as the *khanapuri* started. The demarcation was very indifferent, generally owing to the want of knowledge on the part of the inhabitants of their proper boundaries. The health of the establishment was good.

The expenditure during the year under report was Rs. 75,523, but as all the records were not completed by 30th September, it is impossible to arrive at a cost-rate from these figures. It is known, however, that Rs. 29,850 will be expended during October in completing the work and paying up amounts kept in hand to prevent establishments from absconding, and that Rs. 4,200 will be required next season to complete the survey of the 21 square miles remaining and the *khanapuri* of 135 square miles. Therefore the total expenditure will

be Rs. 1,09,573 for 642 square miles of survey and *khanapuri*, or a cost-rate of Rs. 170 per square mile.

The scattered nature of the work, the high rates demanded for coolie labour, viz., two and three annas a day per coolie, and the inexperience of a first-year establishment precluded any possibility of a really low cost-rate being attained.

PART II.—REPORTS ON SURVEYS AND RECORDS-OF-RIGHTS IN PRIVATE ESTATES.

MAJOR SETTLEMENTS.

BHAGALPUR DISTRICT.

Traverse Survey.

13. The traverse survey programme in this district comprised the Ganges "diara" as far south as the southern high bank of the river and also the portion of the Kosi diara which lies in thanas Kishanganj and Madhipura.

The whole area for survey amounted to 468 square miles, of which 168 square miles were traversed in full detail for subsequent cadastral survey on the 16-inch scale and 300 square miles were traversed for a topographical survey on the 4-inch scale. The 168 square miles consisted of uplands and such temporarily settled and Government estates as lay in the "diara."

There are 4,981 theodolite stations in the area traversed, which are marked by 415 stones, 246 cylinders and 4,320 pegs.

To check the angular work, 29 azimuths were observed and the mean variation of the magnetic needle proved to be 1° 24′ east.

The health of the establishment was on the whole good, but there was a certain amount of sickness when working in the Kosi diara.

The demarcation in the upland tract was good, but as the survey in the "diara" was by blocks and not *mauzawar*, the inhabitants were not called upon to demarcate.

The country traversed presented no special difficulties except in the Kosi "diara," where extensive tracts of high and impenetrable grasses were met with.

In order to avoid the expense of clearing lines through these grasses along the edges of the numerous channels of the Kosi river, a system of zig-zag traverses with the subtense bar from bank to bank was adopted.

The traverse camp was working under very high pressure throughout the earlier months of the field season, as it had to provide plots of all this area for immediate cadastral and topographical survey in addition to its very large programme in the Purnea district.

The expenditure has been Rs. 6,013 on *mauzawar* traversing and Rs. 7,677 on traversing for topographical survey. The resulting cost-rates are Rs. 35·8 per square mile for the ordinary traversing and Rs. 25·6 per square mile for traversing for topographical.

The rate for the ordinary traversing of Rs. 35·8 per square mile is high, because the whole cost of the move of the camp into the field fell into the first months of the season when the camp was working in Bhagalpur and, as the out-turn is a small one, the cost-rate naturally works out high. The cost-rate of Rs. 25·6 per square mile for traversing for topographical is also high, partly for the same season as just noted above, but also because the traverse sub-surveyors were new to this sort of work and therefore ran unnecessary traverses and unnecessarily short lines.

Cadastral Survey.

14. The cadastral survey was carried out by both the Bihar cadastral camps—The camp under Mr. A. W. Smart taking the southern tract adjoining the Ganges river, and the camp under Mr. C. S. Kraal the tract adjoining the Kosi river.

The areas accomplished are 275 square miles of cadastral survey and 282 of record-writing.

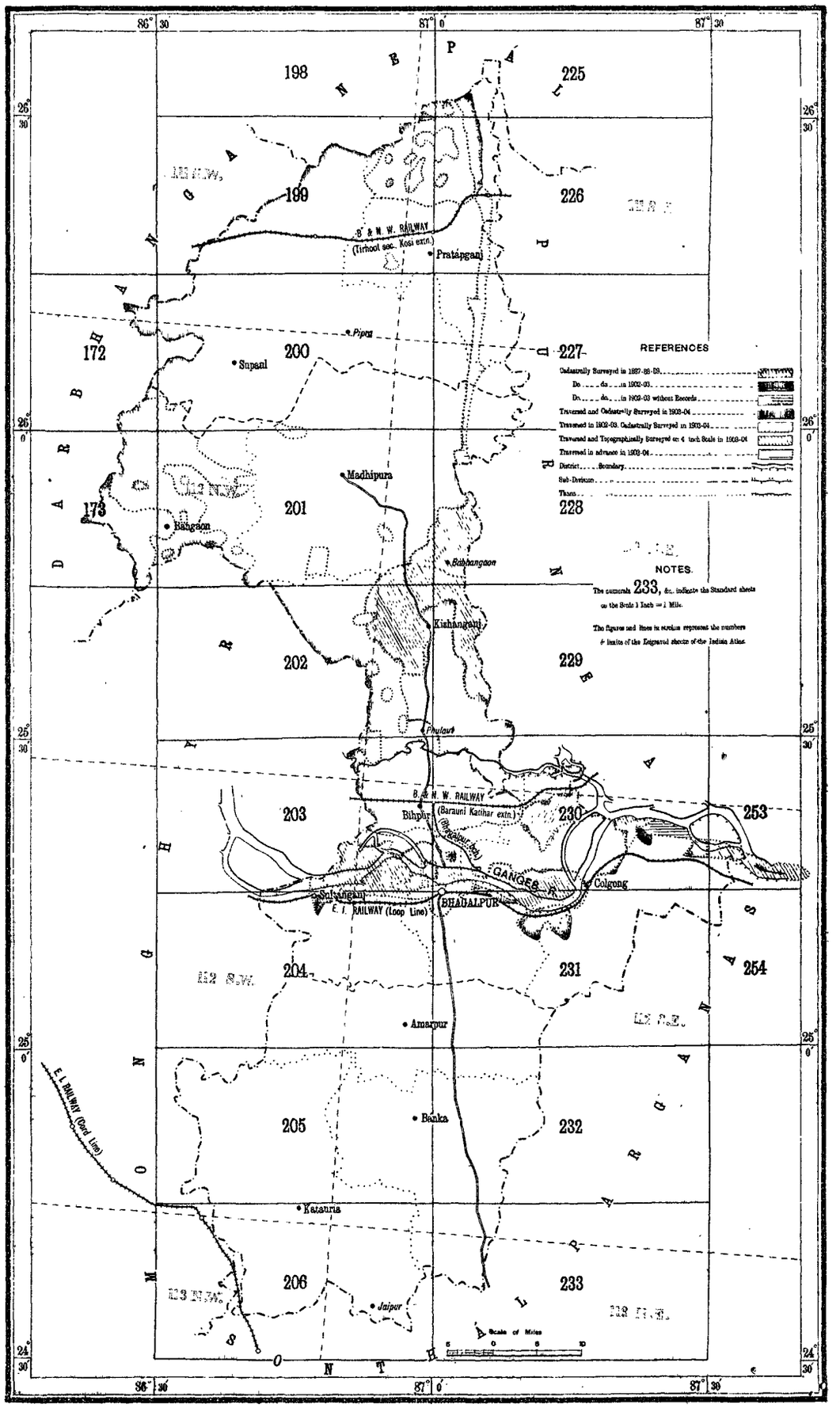
The survey was checked by 1,415 linear miles of re-surveys, which gives an incidence of 5 linear miles of test survey to each square mile of detail.

The entries against 41,743 plots in the records were checked by the survey staff, which gives an average of 31 per cent.

BENGAL SURVEY.

INDEX TO THE TRAVERSE & CADASTRAL SURVEYS IN DISTRICT BHÁGALPUR.

1903-04. No. 4 PARTY.



No. 624, S. f.—Dec. 04.—520

Reg. No. 965-S. 04.

There were 137 boundary disputes, of which 116 have been decided and the balance of 21 will be attended to by the Settlement Department at attestation.

There were 3,207 disputes affecting entries in the record, all of which have been decided except 40, which stand over for the attestation stage.

Considerable trouble was experienced during the season under report owing to the late receipt of plots from the traverse camp and the full programme was only accomplished by keeping the establishment out in the field longer than usual. This will not occur again, as a full programme of 1,600 square miles of upland area (exclusive of any "diaras" that may be taken up in connection therewith) has been and always will be traversed in advance. This difficulty was unavoidable on this occasion, as it was only late in the foregoing recess season that it was decided to survey the greater portions of the Kosi and Ganges "diaras" topographically on the 4-inch equal one-mile scale.

The area cadastrally surveyed was mapped on 401 sheets on the 16-inch scale and no enlargements of village site surveys were found to be necessary.

The village boundaries were all compared with the 4-inch maps of the Revenue Survey and were found to agree well except in the tract adjoining the Kosi river. This was only to be expected, as the Kosi river in its almost yearly changes of its course has altered the whole face of the country.

As in previous seasons, large overlaps had to be surveyed in the Srinagar-Banaili villages before the boundaries of the old maps could be compared and fitted in with the present survey.

At the commencement of the season the usual trouble in obtaining the attendance of tenureholders and "raiyats" during the survey stage was experienced.

The health of the establishment was indifferent at the commencement, but rapidly improved as the season advanced.

The entire season's work has been completed in every respect, and the records and reproduced copies of the maps are under despatch to the Settlement Department.

The expenditure has been Rs. 15,575 for cadastral survey and Rs. 7,371 for record-writing, statistics, etc. The resulting cost-rates are Rs. 56·6 for cadastral survey and Rs. 26·1 for record-writing. The total cost-rate of Rs. 82·7 is very low and is attributable principally to the large average size of the field (1·3 acres each), but also to the Bihar establishment being now fully experienced.

Topographical Survey.

15. The topographical survey of the portion of the Ganges diara and of thesouthern channels of the Kosi river was undertaken by both the Bihar cadastral sections. Owing to the late receipt of plots from the traverse camp, field work could not be commenced until late in March.

The area surveyed on the scale of 4-inch to the mile was 297 square miles, including 10 square miles of the Sonthal Parganas. All topographical items, such as rivers, roads, village sites (in blocks) and patches of cultivation sufficiently large to be mapped have been surveyed. The village boundaries according to present possession were not surveyed, but the village boundaries according to the revenue survey maps of 1846 to 1848 have been transferred into the present sheets and are shown in red dot and stroke lines. As Government estates and temporarily-settled estates lying in diara tracts are cadastrally surveyed, such of these as fell into the topographical sheets were not actually surveyed topographically, but in order to make the plane table sections complete, the cadastral maps were reduced by pentagraph.

The survey of the Ganges diara presented no difficulty, but the survey of the lower reaches of the Kosi river with its constantly shifting and numerous small channels with dense grass jungle up to their banks was not an easy task. The plane table sections were constantly being checked while the survey was in progress by European officers and Inspectors and in addition 343 linear miles of *partals* were run, which gives an incidence of 1·2 linear miles of test survey to each square mile of topographical survey.

The expenditure was Rs. 5,013, which gives a cost-rate of Rs. 16·8 per square mile.

Purnea District.

Traverse Survey.

16. The Bihar traverse camp continued its programme in the district in conjunction with its area in the Bhagalpur district.

The area traversed consisted of 1,997 square miles of uplands in thanas Forbesganj, Araria, Bahadurganj, Islampur, Kasba Amar, Kishanganj and Gopalpur, and 183 square miles of diara in thanas Dhamdaha, Korah and Saifganj. As in Bhagalpur, the diara tract was not traversed *mauzawar* but in blocks and plotted on the 4-inch = 1-mile scale for immediate topographical survey.

There are 38,812 traverse stations in the area surveyed, which have been marked by 4,491 stones, 30,769 cylinders and 3,552 pegs.

Nine great trigonometrical stations have been connected with and the angular work was checked by the observation of 206 azimuths. The mean variation of the magnetic needle proved to be 1° 43′ east.

The demarcation is reported to have been fair in the uplands. As already noted against Bhagalpur, no demarcation was required in the diara. The health of the establishment was good.

The expenditure has been Rs. 53,152 on the usual *mauzawar* traversing, and Rs. 3,012 on the traversing for topographical purposes. The resulting cost-rates are Rs. 26·6 per square mile for ordinary traversing, and Rs. 16·4 per square mile for the traversing for the topographical survey.

The rate of Rs. 26·6 is good. It is slightly higher than last year's rate of 24·3 in this district, but this is accountable for by the smaller average size of the villages dealt with. The rate of Rs. 16·4 for traversing for topographical is fair, considering this is the first season the establishment has been tried at this sort of work, but it should not ordinarily exceed Rs. 12 per square mile, and there is little doubt that in future seasons this rate will be arrived at.

Purnea.

Cadastral Survey.

17. The cadastral operations in the Purnea district were carried on simultaneously with those of district Bhagalpur by both the Bihar cadastral camps. The camp under Mr. A. W. Smart being employed chiefly in thanas Korah, Purnea and Araria and the camp under Mr. C. S. Kraal in thanas Dhamdaha, Raniganj and Forbesganj. The area accomplished in both detail survey and record-writing is 1,499 square miles with 832,151 fields. The survey was checked by 7,722 linear miles of resurveys, which gives an incidence of 5 linear miles of check survey to each square mile of detail. The entries against 265,399 plots in the records were checked by the survey staff, which gives an average of 32 per cent. of the whole number of plots. There were 521 boundary disputes, of which 508 have been decided by the Settlement Department. Out of 53,253 disputes regarding entries in the records, 51,980 have been decided and the balance of 1,273 will be attended to at the attestation stage.

The voluntary attendance of the tenureholders and "raiyats" during the survey stage was not good, therefore in order to ensure the progress of the work, it was found necessary to issue process-fee notices and levy fines to a total amount of Rs. 3,140.

At the commencement of the season, considerable difficulty was experienced in obtaining coolie labour, more especially in the jungly tracts adjoining the Kosi diara, but the Managers of the Darbhanga and Banaili Raj gave ready assistance, and this difficulty therefore did not become so serious as it at one time promised to be.

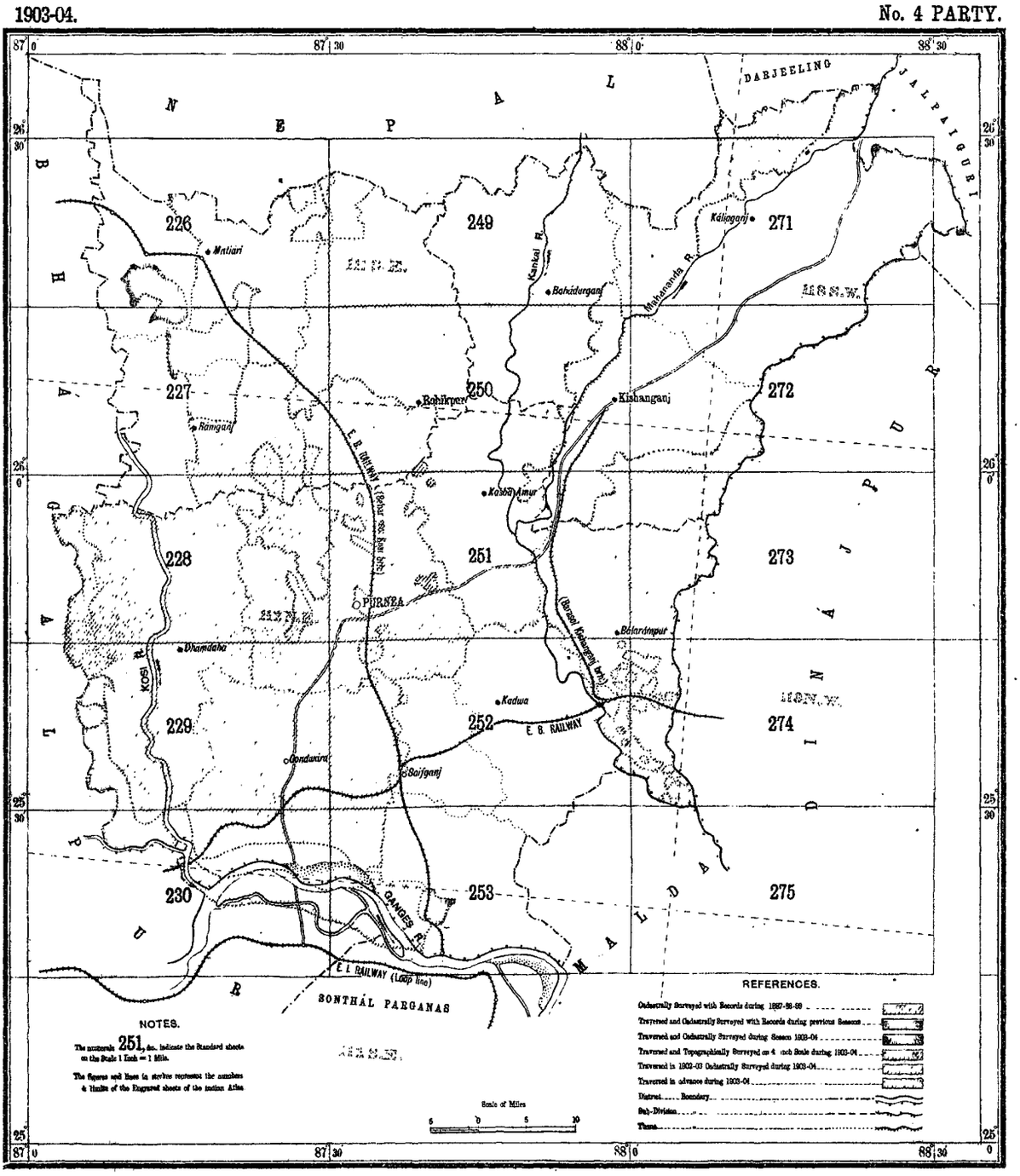
In this district also the inconvenience caused by late receipt of traverse plots was severely felt. The large establishment necessary to complete the full programme had to be found work in the comparatively small area for which plots were immediately available, and on several occasions a serious block was only just avoided.

In addition to a considerable amount of overlap surveys which were necessary in order to allow of the Srinagar-Banaili boundary being compared with

BENGAL SURVEY.

INDEX TO THE TRAVERSE & CADASTRAL SURVEYS IN DISTRICT PURNEA.

1903-04. No. 4 PARTY.



No. 624, S. I.—Dec 04.—525.

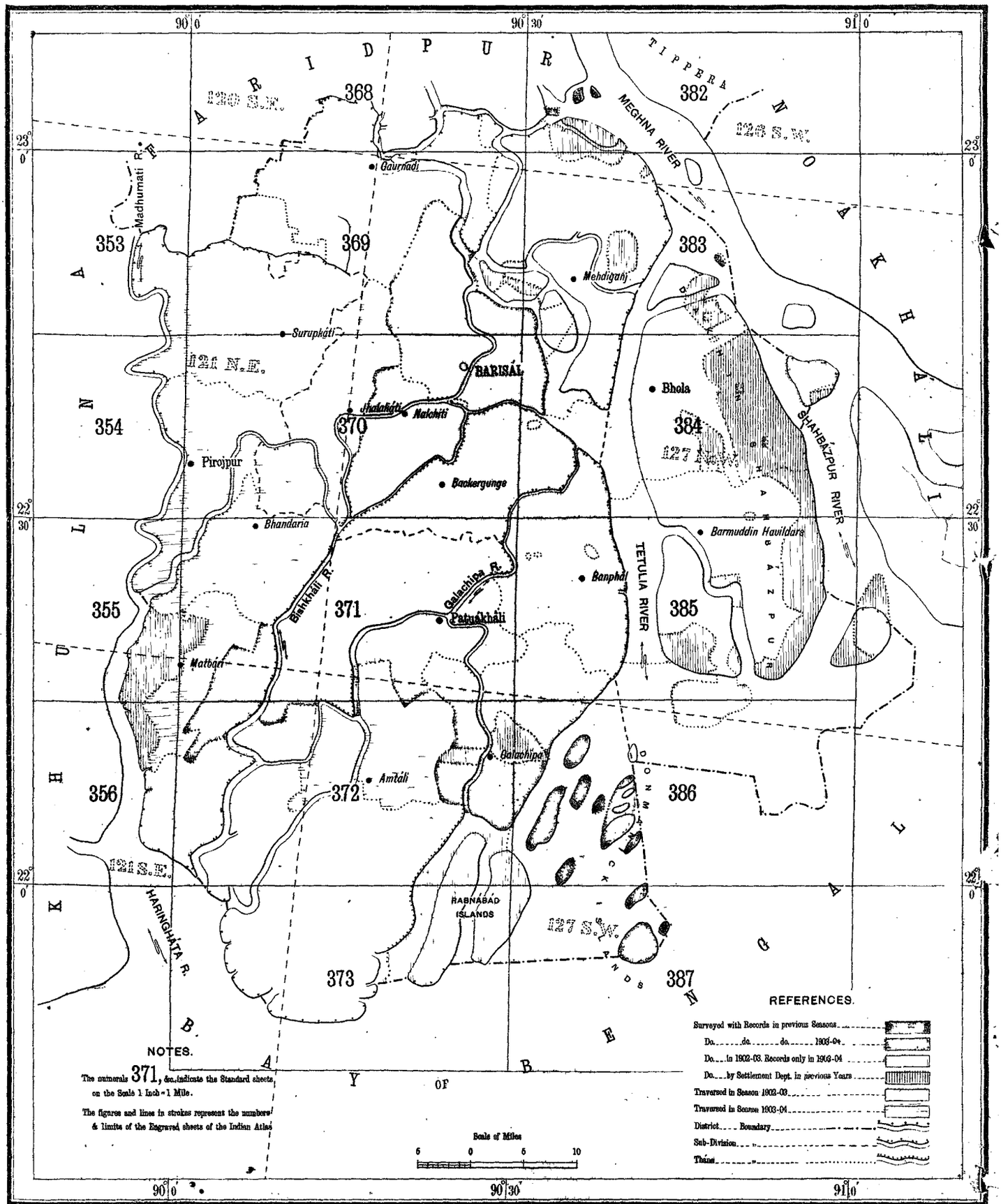
Reg. No. 968-S 04.

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT BACKERGUNGE.

1903-04

BACKERGUNGE DETACHMENT.



No. [illegible]—Dec. 04.—526

Reg. No. 978-S. 04.

the present survey, it was found necessary to survey 905 scattered holdings, aggregating 2,480 acres in 38 villages, which were out of position and configuration. None of this revision work nor of the overlap surveys has been included in the figures of outturn.

There was some sickness at the commencement of the season, but on the whole the health of the establishment was good.

The preliminary demarcation of village boundaries was found to be good and the usual comparison with the revenue survey maps of 1842 to 1848 shows few changes of any importance except in the Kosi "diara" tract.

All the maps and records have been completed in every respect and the records and reproduced copies of the maps have been forwarded to the Settlement Department.

The expenditure has been Rs. 97,346 and Rs. 54,882 for cadastral survey and record-writing respectively. The Corresponding cost-rates per square mile are Rs. 64·9 and Rs. 36·6. The resulting total cost-rate is Rs. 101·5 per square mile for both cadastral and records. This is a very low rate and is attributable to large fields (1·1 acre each), large and compact programme and to rapid rate of work by a fully experienced establishment.

Topographical Survey.

18. As soon as plots were forthcoming from the traverse section, both the Bihar Cadastral sections put establishments into the Kosi and Ganges diaras.

The same procedure, as already described for the Bhagalpur topographical work, was followed in this district.

The area surveyed on the 4-inch scale was 166 square miles.

The cost was Rs. 2,246, which give a cost-rate of Rs. 13·5 per square mile.

District Backergunge.

Traverse Survey.

19. The programme consisted of the completion of the district, excluding the Sundarbans tract, but as it was discovered that the available area did not provide a full programme for the traverse detachment, sanction was afterwards accorded to the traverse of an area of about 60 square miles in the north of thana Amtoli lying within the Sundarbans but all cultivated and therefore for subsequent cadastral survey.

The total area accomplished was 843 square miles. There are 22,730 theodolite stations, of which 2,030 are marked with stones and the balance by pegs. All the stations of the circuit running through the Sundarbans have been specially marked so as to ensure easy connection next season, by big wooden pegs three and-a-half feet long and about five inches in diameter.

The angular work was checked by 150 azimuths and the mean magnetic variation is 1° 05′ east. Practically no attempt had been made by the inhabitants to carry out the preliminary demarcation. This did not matter in the tracts where "khals" or tidal creeks form the village boundaries, and in the other portions of the area under survey the traverse sub-surveyors were guided by their revenue survey traces.

In thanas Sarupkati and Bhandaria there are two large swamps or "bhils," covering about 50 square miles each, which gave a lot of trouble, as it was very difficult to find or make firm standing ground for the theodolites. A new procedure will be followed in such tracts in future whereby points for the detail survey will be fixed by intersection from stations on the surrounding circuit which will be on firm land. This procedure will give better mathematical results and be quicker and cheaper. In the Bhandaria bhil considerable difficulty was experienced in getting the traverse sub-surveyors to stick to their work through fear of the wild buffaloes which inhabit this tract.

In thanas Jhalukati and Pirojpur the country is intersected by numerous small rivers and "khals" and crowded with scattered homesteads each of which is surrounded by palms and therefore interferes with the line of sight, thus necessitating short traverse lines and consequent delay in progress. The expenditure was Rs. 48,133, which gives a cost-rate of Rs. 57 per square mile. This is Rs. 13 per square mile higher than last year's rate and the increase is in

part due to the difficulties already explained and in part to the reduced outturn of the detachment. Last year the detachment had a programme of 1,551 square miles in districts Backergunge and Midnapore, whereas during the season under report it was allotted a programme of 864 square miles in the same districts and it has been agreed that the most economical way to work a traverse camp is to give it a programme of at least 1,600 square miles, which will invariably be the case in future.

In paragraph 16 of last year's report reference was made to some arrears work: this has been completed, as also the whole work of the season under report.

Cadastral Survey.

20. The programme in this district consisted of the cadastral survey with record-writing of 405 square miles in the island of Dakhin Shahbazpur, of 468 square miles of survey and record-writing in thanas Gaurnadi and Mehdiganj and the record-writing of the 96 square miles of the Rabnabad islands which had been surveyed during the previous season. The areas accomplished are 867 square miles of cadastral survey and 963 of record-writing which agree with the programme except for 9 square miles not completed in record-writing owing to high tides. This small area will be completed next season. The outturn figures above do not take credit for large rivers which fell into the tract under survey. These rivers including the Tetulia and Ilsa with an area of 150 square miles have been surveyed and can be mapped at any time on the standard sheets.

The survey was checked by 3,745 linear miles of *partals* which gives an incidence of 4 linear miles of test survey to each square mile of detail. As regards the record-writing, the entries against 151,665 plots were checked by the survey staff, which gives an average of 25 per cent.

There were only 90 boundary disputes, all of which were decided by the Settlement Department. Of the 10,482 disputes raised at time of record-writing, 10,451 have been settled and 31 left over for the attestation stage.

The establishment of up-country "amins" was greatly reduced during the year under report, only 7 foreign inspectors and 28 foreign "amins" being employed. The foreign inspectors were examined and passed by the Settlement Officer before they were permitted to supervise the record-writing.

The expenditure on cadastral survey was Rs. 83,557 and on record-writing Rs. 29,742; the resulting cost-rates being Rs. 96·5 and Rs. 30·9 per square mile, as against the rates of Rs. 114·7 and Rs. 53 of the previous season.

The total rate of Rs. 127·4 for both cadastral survey and record-writing is not quite final, as the statistical statements of 26 villages have not been completed but will be ready in plenty of time for the Settlement Officer's requirements. In any case the final rate cannot exceed Rs. 130, which shows a very satisfactory reduction which is attributable chiefly to the firm and good management of Mr. N. Bedford in charge of the detachment.

DISTRICT RANCHI.

Traverse Survey.

21. The Chota Nagpur Traverse Detachment, under Mr. T. W. Babonau, continued its programme in the Ranchi district and, during the year under report, traversed 861 square miles in thanas Karra, Basia, Bano and Kolebira.

The angular work was checked by 184 azimuths and the mean magnetic variation was 1° 05′ east.

The season's work has been connected with two great trigonometrical stations.

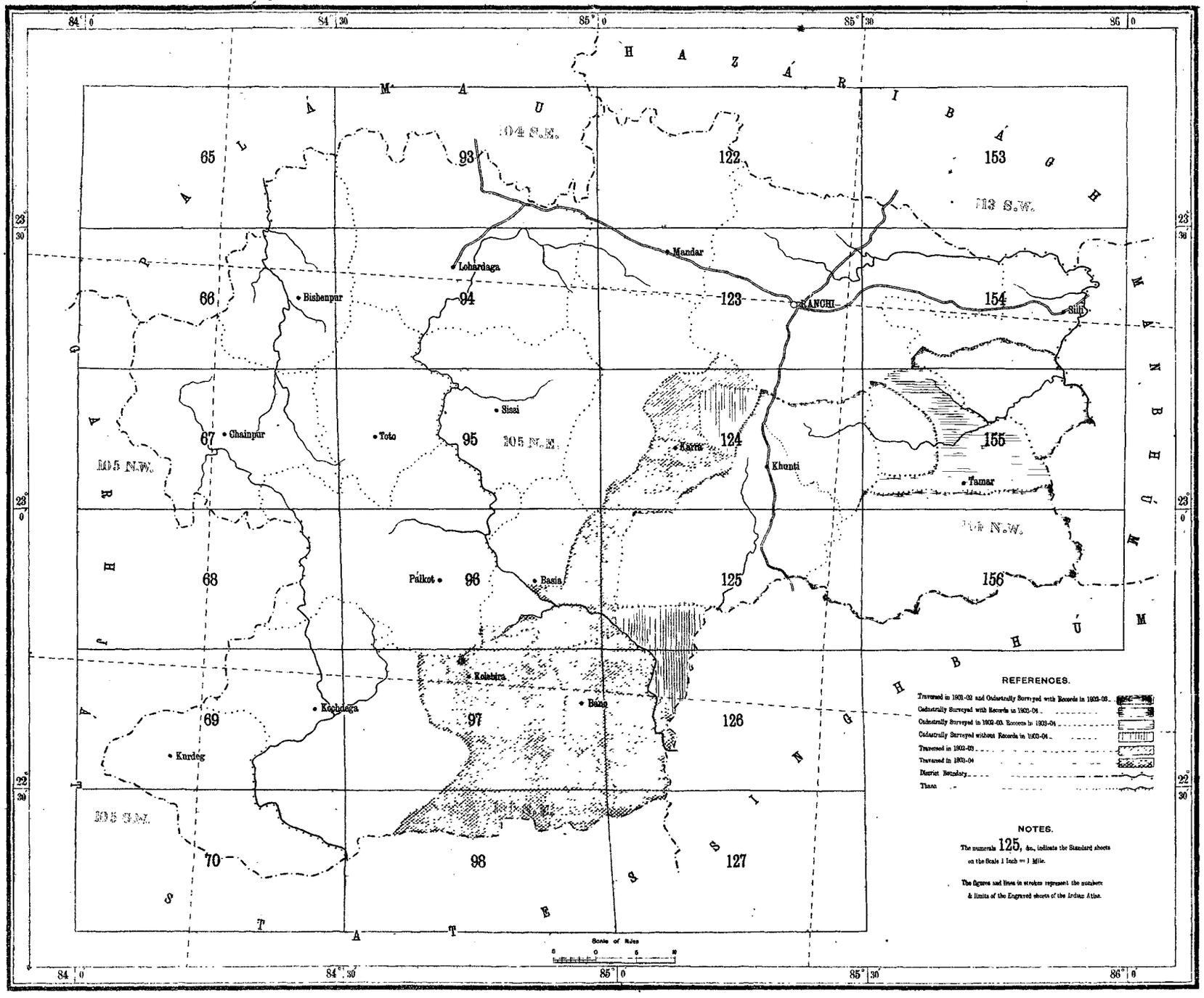
Three-fourths of the country surveyed during the season is hilly and necessitated the constant use of the subtense bar.

The health of the establishment was very bad, large numbers being incapable of work for lengthy periods owing to malarial fever.

There were 20,077 theodolite stations which were marked as follows: 758 trijunction marks by stones with a triangle and dot in centre cut thereon, 13,472 stones with a broad arrow cut thereon, 1,674 broad arrow marks on rocks and 4,173 pegs.

1903-04.

INDEX TO THE TRAVERSE & CADASTRAL SURVEYS IN DISTRICT RANCHI.



REFERENCES.

- Traversed in 1901-02 and Cadastrally Surveyed with Records in 1902-03
- Cadastrally Surveyed with Records in 1902-03
- Cadastrally Surveyed in 1902-03. Records in 1903-04
- Cadastrally Surveyed without Records in 1903-04
- Traversed in 1902-03
- Traversed in 1903-04
- District Boundary
- Thana

NOTES.

The numerals 125, &c., indicate the Standard sheets on the Scale 1 Inch = 1 Mile.

The figures and lines in strokes represent the numbers & limits of the Engraved sheets of the Indian Atlas.

No. 624, S. f.—Dec. 04.—525

Reg. No. 967-S. 04.

There are no maps in existence showing village boundaries in this district and as the preliminary demarcation, supposed to be done by the inhabitants, was found to be wanting, the surveyors traversed the villages as pointed out. The Deputy Commissioner provided a list of villages and indicated their approximate position on a trace from the old 1-inch = 1-mile topographical maps. These lists and maps were found to be very useful, and as the inhabitants readily pointed out their boundaries, and generally afforded all assistance, the inconvenience of not having any preliminary demarcation was not much felt.

The new pattern of subtense bars, mentioned in paragraph 7 of last year's report, has continued to prove a complete success.

All the computations and plotting have been completed in every respect.

The expenditure was Rs. 27,528, including shares of control and charge for instruments.

The resulting cost-rate is Rs. 32 per square mile, which is Rs. 3 per square mile more than last year's rate, but is still a good rate for such difficult country, where subtense bar measurements have to be largely resorted to instead of the ordinary chaining.

Cadastral Survey.

22. The cadastral survey in the Ranchi district remained in charge of Mr. W. Skilling.

The outturn of the season was 748 square miles of survey and 801 square miles of record-writing. The area of 179 square miles of thanas Tamar and Silli, which remained over for *khanapuri* from the previous season, has been completed and is included in the 801 square miles of record-writing, but a tract of 91 square miles in the south of thana Khunti, which has been surveyed during the year under report, stands over for *khanapuri* for next season. The survey outturn also includes a compact block of 34 square miles in thana Karra, which was surveyed by "amins" under training. As this block passed all the usual tests it has been taken credit for in the outturn accomplished although it was not included in the original programme.

The survey has been tested by 2,712 linear miles of *partals*, which gives an incidence of 3·6 linear miles of test survey to each square mile of detail. Also 85 blocks, aggregating 669 acres, were resurveyed in places where *partal* lines could not be run owing to dense jungle. To check the record-writing, the entries against 137,632 plots were tested by the survey inspecting staff. This gives an average of 25 per cent. of the whole number of plots *khanapuried*. There were 550 boundary disputes, all of which were decided by the Settlement Department. Half the area under survey was very difficult to deal with, as it consisted of wooded hills with scattered and irregularly shaped blocks of cultivation which had to be fixed by plane table intersections through dense jungle and across ravines which it was impossible to chain. The health of the establishment was bad, but considerably better than it was during the previous season.

The average daily outturn of the "amins" in both survey and *khanapuri* were very poor and it was only possible to complete the large outturn accomplished by increasing the establishments during the season. A considerable number of men have been carefully trained during the year, and as the establishment gains experience the daily average will improve, which will allow of weeding out the inefficient men.

The demarcation is reported to have been very defective, which delayed progress considerably. A special difficulty in this survey has arisen owing to the necessity of correctly incorporating the surveys of *bhuinhari chaks* in our maps. These *bhuinhari chaks* are scattered rent-free-holdings which were surveyed by a Special Commissioner, and it has been declared that these *bhuinhari* maps which were compiled between 1870 and 1880 are final and unalterable records. Although these *chaks* were supposed to be demarcated, the demarcation was very defective and especially in rice tracts where the fields are divided into numerous *kittas* for irrigation purposes, attempts by the tenureholders to include *kittas* to which they were not entitled were frequent. In order to frustrate these attempts it was found necessary to survey every *kitta* in these *bhuinhari chaks*. In office a comparison with the

old maps had to be made and, as was only to be expected, differences were not infrequent, which necessitated constant resurvey. As in the original survey these *chaks* are often out of position with respect to one another, their correct incorporation in the professional maps is of great value.

The expenditure has been Rs. 71,591, the resulting cost-rates for survey and *khanapuri* being Rs. 57·8 and Rs. 35·4 per square mile respectively. These rates are very low and are attributable to labour being supplied free and to the large average size of the field.

In paragraph 22 of last year's annual report reference was made to disputes along the Ranchi Singhbhum boundary: these have been settled and a special traverse run along the boundary with theodolite stations at the sites of pillars. A trace on the 4-inch scale and copy of the traverse data have been made over to the Settlement Officer for record in the Commissioner's office.

District Singhbhum.

Traverse Survey.

23. The traverse survey of the Seraikela and Kharsawan estates was ordered. The total area reported for survey was 583 square miles, but the area traversed proves to be exactly 600 square miles, viz., 445 square miles Seraikela and 155 square miles Kharsawan.

The work was undertaken by the Chota Nagpur detachment in addition to its programme in district Ranchi.

About one-fourth of the whole area is hilly and jungly.

The angular work was checked by 100 azimuths and the magnetic variation is 1° 19′ east. There are 14,420 theodolite stations which are marked by 1,518 trijunction stones, 10,666 ordinary stones, 1,839 pegs and 397 cuts on rocks *in situ*. The system of marking adopted was exactly the same as described for the Ranchi district. This remarks regarding demarcation made in the Ranchi report apply to this survey also. The computing and plotting have been completed in every respect.

The expenditure was Rs. 20,178, which gives a cost-rate of Rs. 33·6 per square mile. This rate is rather high, but it includes the cost of moving the field office and establishment from Ranchi.

PART III.—REPORTS ON MISCELLANEOUS SURVEYS.

Calcutta Suburbs Survey.

24. This survey was continued during the year under report by a detachment under Mr. R. B. Smart.

The added area of the town of Calcutta is 8,443 acres, but during the year it was decided to also survey the adjoining area of the Panchanogram Government estate. This additional area is 2,207 acres, of which 313 acres were to be surveyed on the scale of 50 feet to 1-inch scale, and the balance on the scale of 32 inches to the mile. The total programme of this detachment is therefore 8,756 acres of survey on the 50-foot scale, and 1,894 acres on the 32-inch scale.

During the year 4,513 acres have been traversed, 5,561 acres have been surveyed in detail and the record of 4,850 acres has been written. These figures added to the outturn of the previous year show that in order to complete the programme the following amount of work remains: Traverse of 1,109 acres for subsequent large scale survey and traverse of 1,825 acres for survey on the smaller scale, detail survey of 1,111 acres on the 50-foot scale, and detail survey of 1,762 acres on the smaller scale. Also the record-writing of 5,653 acres.

The usual method of testing the accuracy of the detail survey by running *partal* lines is of course unsuitable to a town survey, but the work has been carefully checked by European officers and inspectors and blocks resurveyed as an independent test. The work has proved to be most accurate and, in many cases when theodolite sub-traverses were plotted on to the sheets after the detail survey, it was always found that the "amins" stations were exactly correct. This is a test that only an extremely accurate survey could pass.

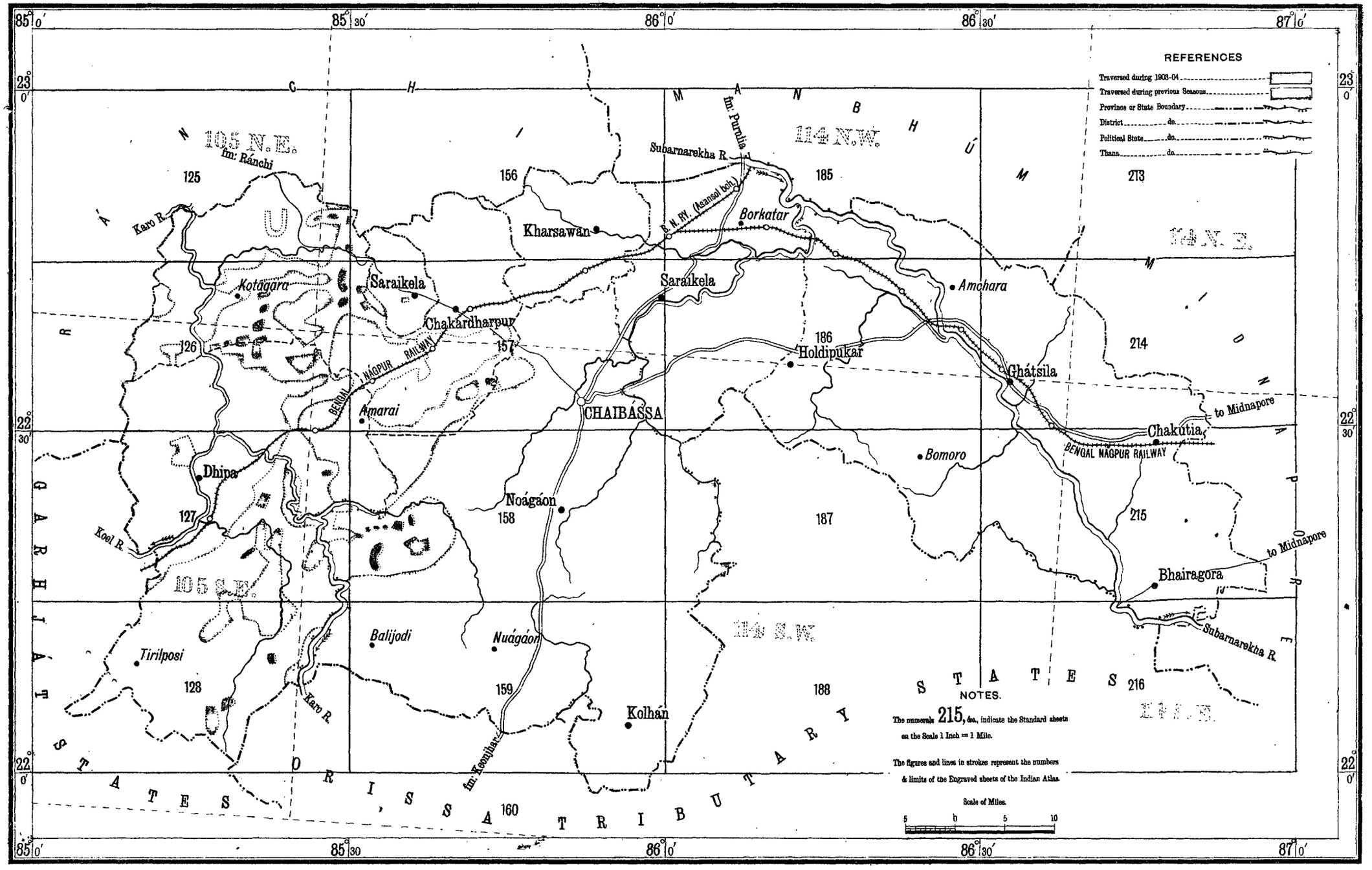
The attendance of tenants is reported to have been very good on the whole, but it has been necessary to issue a large number of notices under the

BENGAL SURVEY.

INDEX TO THE TRAVERSE SURVEY IN DISTRICT SINGHBHÚM.

1903-04

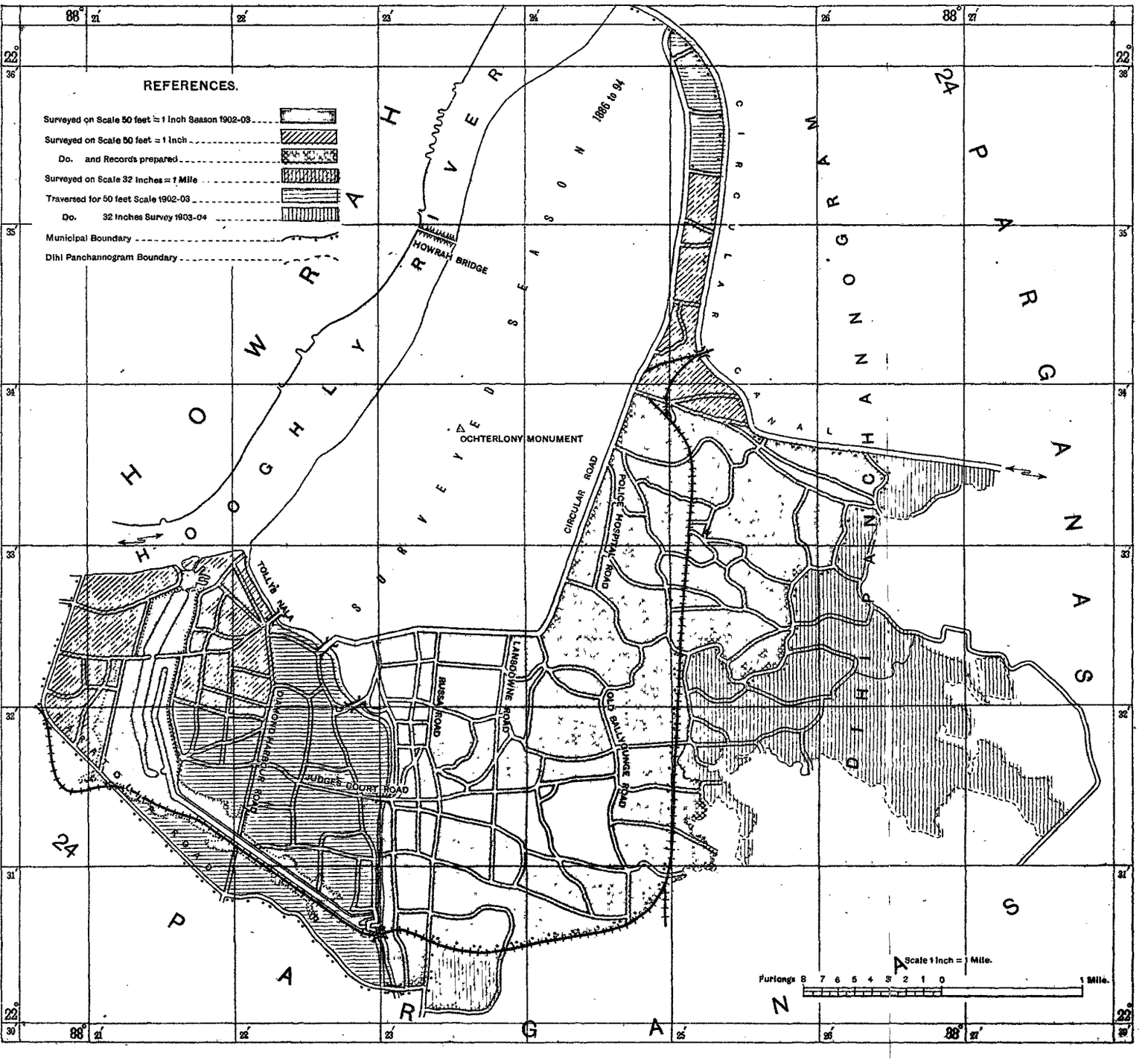
CHOTA NÁGPUR DETACHMENT.



No. 681, S. I.—Dec. 4—525.

Rec. No. 977 S. 04

INDEX TO THE SURVEY
OF
THE ADDED AREA TO THE TOWN OF CALCUTTA AND PORTION OF DIHI PANCHANNOGRAM 1903 - 04.



No. 698, S. I.—Dec. 04.—525.

Reg. No. 602-S. 05.

Survey Act on owners of revenue holdings who generally were very reluctant to produce documents showing the numbers of their holdings. The difficulties owing to the complication of both municipal and revenue holdings having to be defined and to numerous boundary disputes have been very great. It was necessary to compare the revenue holdings as now demarcated with the old revenue holdings; this is a difficult task, requiring great care and considerable differences have been discovered. Orders to the effect that temporarily-settled holdings must be kept separate from permanently settled necessitated a good deal of extra work. There were 399 boundary disputes and a Deputy Collector was especially appointed to deal with these and later on a Sub-Deputy Collector was added. Only 185 disputes were decided, but it is hoped that now with two officers on this work the progress will be more rapid, because it is estimated that there will be about 1,000 disputes altogether and many stages of the work are dependent on the decision of these disputes.

The area demarcated to date is 4,567 acres, comprising 6,939 municipal holdings, which is 50 per cent. more than the number supplied by the Municipal Corporation.

The area calculations are practically up to date, but is of course seriously affected by undecided boundary disputes. A start has been made in the final mapping and a trial in reproducing the maps by the Vandyke process has been completely successful.

The expenditure during the year has been Rs. 64,472, but as no branch of the work is as yet complete, the calculation of cost-rates has not been undertaken.

Bhagalpur District.

Bhagalpur Municipality.

25. In paragraph 23 of the last year's report it was stated that the whole area of this Municipality had been traversed, but it was discovered at an early stage of the detail survey that some of the outlying portions which had not been previously demarcated had been omitted. These portions amounting to 3 square miles have been traversed during the year under report.

The detail survey and writing up of the record of occupancy has been undertaken by the Cadastral camp under Mr. C. S. Kraal. The whole area of 12 square miles has been surveyed and the record of occupancy which contains 33,371 holdings has been completed. The congested areas, aggregating 1·3 square mile were surveyed on the scale of 64 inches equal one mile and the balance of 10·7 square miles on the ordinary 16-inch scale, but enlargements had to be made in several cases to permit of the numbering of holdings being legible. The 64-inch work is comprised in 23 sheets and the 16-inch work in 21 sheets. Altogether 57 linear miles of "partals" have been run which gives an average of 4·75 linear miles of test survey to each square mile of detail. In addition to this, 59 blocks were resurveyed. The entries against 9,737 numbers in the record were tested. The Municipal holding was maintained as the unit of survey and given a number; all items within the holding, such as tanks, houses, etc., were given separate letters.

The maps and record of occupancy have been made over temporarily to the Municipal Commissioners to allow of the new assessment being proceeded with. On return of the maps and record the numbering which at present is sheet by sheet will be brought into one serial and the wall map on the 16-inch scale will be compiled.

The expenditure which is met by deposits, was Rs. 306 for traverse and Rs. 7,857 for the detail survey and record.

Owing to a severe outbreak of plague the work had to be stopped and all establishments withdrawn from 23rd March to 14th June.

Monghyr District.

Monghyr Municipality.

26. At the request of the Municipal Commissioners and with the approval of the Bengal Government, the survey of this Municipality was undertaken by the Bihar Cadastral Camp under Mr. A. W. Smart.

In order to do the work as cheaply as possible it was decided to only survey the congested portions on the scale of 64-inches to the mile and the balance on the ordinary 16-inch scale.

The traverse survey was done in 21 blocks by the Bihar Traverse Camp and covered 6 square miles. The detail survey in comprised in 22 sheets, mapping 910 acres on the 64-inch scale and 2,770 acres on the 16-inch scale.

The survey has been checked by 47 linear miles of test survey which gives an average of 8 linear miles of test survey to each square mile of detail. A record of occupancy has been written for 18,266 holdings. The average size of the holding in the congested area was only ·07 of an acre and in the uncongested area ·52 of an acre.

There were no boundary disputes, but the work which continued through the recess season, was much retarded owing to the heavy rains and prevalence of plague.

The following amount of work only remains:—

(*a*) numbering of plots in one serial.
(*b*) area calculation,
(*c*) comparison of map with khasra, and
(*d*) compilation of a wall map in the 16-inch scale.

The expenditure has been Rs. 2,675 which is met by sums deposited by the Municipality.

SHAHABAD DISTRICT.

27. In paragraph 28 of last year's report it was stated that if the wooden posts demarcating the boundary of Umarpur diara were found to last through the rains, these points would be permanently demarcated. It was found during the year under report that not a single post remained and the Collector agreed that it would be useless to erect permanent marks.

CHAMPARAN DISTRICT.

28. The Subdivisional Officer of Bettiah asked that the boundary of mauza Karaulia Bhasauli be retraversed and demarcated. This has been done at a cost of Rs. 218 which is met by deposits.

MONGHYR DISTRICT.

29. The relaying of the boundary of mauza Darobust, referred to in paragraph 25 of last year's report was continued and completed during the year under report at a cost of Rs. 396 which is met by deposits.

PATNA DISTRICT.

30. The relaying of the northern boundary of mauza Ghora *urf* Katora according to the old revenue survey was ordered by Government. A traverse surveyor was sent during the recess season and has completed the work which is being tested by a European officer.

DARBHANGA DISTRICT.

31. The village of Chaparsan which had been topographically surveyed on the 16-inch scale in 1896-97 was, under the orders of Government, cadastrally surveyed and khanapuried during the year under report. The traverse survey was undertaken by the Bihar Traverse Camp and the detail survey and record-writing by the Cadastral Camp under Mr. C. S. Kraal.

The area surveyed was 7 square miles which was checked by 15 linear miles of "Partals." The khanapuri of 656 pots was completed and the entries against 396 plots checked. The cost has been Rs. 230 for traversing and Rs. 702 for detail survey and record-writing.

Rosera Municipality.

32. The detail survey and record-writing of this Municipality which was referred to in paragraph 24 of last year's report has been completed. The outturn of the season under report was 36 acres of survey and the khanapuri of

4,784 plots. The whole area is 318 acres with 6,251 plots. The survey which is on the 64-inch scale is comprised in 13 sheets. The expenditure during the year is met by deposits and amounts to Rs. 251.

Udaipur State.

33. At the request of the Commissioner of the Chota Nagpur Division two traverse sub-surveyors were detailed to traverse the boundary of the Udaipur State as demarcated by the Special Officer employed in this work. One hundred and fifty-one linear miles, which is about half the length of the whole boundary have been traversed and the remainder will be completed next season.

PART IV.—REPORT ON THE BENGAL DRAWING OFFICE.

34. Mr. E. F. Berkeley has been in charge throughout the year under report. The work of this office is carried out by six different sections, each of which is reported on separately below.

The amount of work accomplished during the year is far in excess of that of any previous year, and as the work is still increasing, it will be necessary to move into more commodious quarters at an early date.

Standard and District Mapping Section.

35. The programme of the year was as follows:—

(*a*) Completion and correction of the remaining four standard sheets of Orissa.
(*b*) Completion of 14 standard sheets of district Darbhanga.
(*c*) Completion of 14 standard sheets of district Chittagong.
(*d*) Preparation of as many district maps on the 1-inch=4 miles scale as could be undertaken.
(*e*) Preparation of as many traverse charts of Orissa, Bihar and Chittagong as could be undertaken.

As regards (*a*): The four standard sheets of Orissa have been completed and submitted for publication.

As regards (*b*): Four out of the 14 sheets of Darbhanga have been completed and submitted for publication. Three are nearly completed and will be sent in shortly. The remaining seven have been delayed on account of the incorporation of the latest surveys of districts Monghyr and Bhagalpur so as to complete these sheets up to margin. These seven sheets are well advanced and will be published during next year.

As regards (*c*): The 14 standard sheets of Chittagong have been completed and submitted for publication. This work has taken much longer than was expected owing to differences which necessitated constant references to the Deputy Surveyor-General and to the Collector.

As regards (*d*): The district maps of Muzaffarpur and Balasore have been completed and sent in for publication. The district map of Saran has also been completed, but its publication is delayed until October on account of recent changes in district and thana boundaries. The district maps of Cuttack and Puri are well in hand. The district map of Champaran cannot be compiled until standard sheets Nos. 50 and 78 (referred to below) are published. It is very doubtful whether the preparation of a district map of Chittagong should be undertaken as the district was not completely surveyed and the many gaps in the standard sheets can only be filled up by utilizing obsolete data. This point is being referred to the Deputy Surveyor-General.

As regards (*e*): The preparation of traverse charts on the 1-inch=1 mile scale with lists of the rectangular co-ordinate values of all trijunction points from origin has been ordered by the Surveyor-General during the year under report. No establishment was available at the time and computors had to be trained. The work accomplished to date consists of the computations of co-ordinates from origin of 3,445 villages of district Muzaffarpur and 1,075 villages of district Darbhanga. The new computors are now getting accustomed to the work, and it is hoped that the lists and charts of Bihar and Orissa will be completed by the end of next survey year. In addition to the items of work already mentioned, this section had to incorporate Colonel Tanner's

survey with the topographical survey of North Champaran on standard sheets Nos. 50 and 78. Sheet No. 50 has been completed and No. 78 is practically completed. As soon as it is published the district map of Champaran can be taken in hand.

Thana Mapping Section.

36. The programme of this section for the year was as follows:—

(*a*) Maps of 9 thanas of Orissa.
(*b*) Maps of 2 thanas of district Champaran.
(*c*) Maps of 10 thanas of Darbhanga.
(*d*) Maps of 13 thanas of Chittagong.

Eight out of the 9 thanas of Orissa have been completed and published. The remaining thana map was completed, but was sent back to the Collector of Cuttack, in accordance with his request, as it was stated that the numbering of the villages was wrong. The corrected map and list have not be received back yet.

The two thanas of Bihar could not be published pending completion of standard sheets Nos. 50 and 78, but they should be ready for publication in October 1904. The thana mapping of district Darbhanga had to be postponed as none of the standard sheets could be published owing to the necessity of completing same up to margin.

Five out of the 13 thanas of Chittagong have been published and the remaining 8 have been practically completed, as far as tracing is concerned, and can be completed and published as soon as the proofs of the standard sheets are received.

It will be noted that the outturn of this section does not come up to the programme, but as the publication of thana maps depends on the publication of standard sheets, the low outturn was unavoidable. Owing to the utilization of the Vandyke process of reproduction, the low cost rate of last year has been maintained.

Reproduction of Village Maps.

37. This work really employs three sections, viz., (*a*) Tracing Section, (*b*) Vandyke Section, and (*c*) Printing Section. In the case of maps prepared on the new transparent paper (*vide* paragraph 4 of last year's Annual Report) there is no necessity for the intermediate traces.

The programme was as follows:—

(*a*) Reproduction of 10 copies of 1,362 sheets of Orissa = 13,620 maps.
(*b*) ,, ,, 6,996 ,, of Saran = 69,960 ,,
(*c*) ,, ,, 187 ,, of Bogra = 1,870 ,,
(*d*) ,, ,, 220 ,, of Kalimpong = 2,200 ,,
(*e*) ,, ,, of as many of the 6,560 sheets of district Muzaffarpur as could be completed.

Subsequently, the two following urgent items of work were introduced into the programme, viz.:—

(*f*) Reproduction of 1,050 sheets of district Backergunge at the average of 150 copies of each = 157,500 maps.
(*g*) Reproduction of 2 or 3 copies of each of the 6,648 sheets of the outturn of the field parties during the year under report.

As regards (*a*): On counting up the remaining sheets of Orissa, it was found that only 1,147 sheets remained to complete this work. All these have been completed except 20 which are awaiting replies to references made to the Collectors concerned.

As regards (*b*): Out of the 6,996 sheets of Saran, 5,389 have been traced. This, with the 604 of last year, gives a total of 6,993, all of which have been examined during the year under report. Of these 4,103 sheets have been reproduced and 30,000 maps have been despatched to the Collector.

As regards (*c*): The reproduction of the 187 sheets of the Jaipur estate in district Bogra could not be undertaken because, on receipt of the sheets, it was found that no "badars" had ever been submitted by the Settlement

Department. The progress made in correcting these sheets is reported on under the head of Miscellaneous work in paragraph 41.

As regards (*d*): It was intended to reproduce 10 copies of each of the 220 sheets of the Kalimpong survey but the Vandyke and Printing Sections were already working overtime on the Backergunge work and consequently this work, like that of Saran, had to suffer. The sheets have, however, all been traced and examined, and now that the extra plant has been received, the copies should all be ready by December.

As regards (*e*): Late in the season a start was ordered to be made with the reproduction of the sheets of Muzaffarpur. There are altogether 6,560 sheets of which 10 copies of each are required. During the year under report 2,000 sheets have been traced, but it was impossible to reproduce any. As the Backergunge programme will be completed by November, it is estimated that the Muzaffarpur work should be out of hand early next financial year.

As regards (*f*): During the year it was decided to provide the Settlement Officer of Backergunge with reproduced copies of the sheets of the first year's operations in the district. It has originally been estimated that an average of 30 copies per sheet would be required, but, with a view to providing each "parcha" holder who was in immediate possession of one or more plots with a copy, it was decided a copy for every 5 plots would be required. The programme therefore consisted of tracing and examination of 1,050 sheets, reproduction of same and printing of 157,500 copies at an average of 150 copies per sheet. This heavy programme necessitated the immediate increase of plant in both the Vandyke, and Printing Sections. Presses were ordered by wire from England and in the meantime three old presses were obtained on loan from the Photographic and Lithographic office of the Survey of India. Of the 1,050 sheets, 789 were traced and examined and 287. reproduced. As the extra presses ordered from England could not arrive until near the close of the year under report it was decided to send traces of 210 sheets to be reproduced by the Vandyke process in the Photo.-Litho. Office of the Survey of India. The total number of sheets reproduced during the year is 497 and the Settlement Officer has been supplied with 18,172 copies. The balance will be supplied by the end of November which is in accordance with the Settlement Officer's requirements.

As regards (*g*): During the year the Board accorded approval to a proposal to substitute direct reproduction by the Vandyke process of all Cadastral maps for the usual traces on vellum which were formerly supplied to Settlement Officers for attestation purposes. Accordingly the 5 Cadastral camps were directed to send the sheets of their current season's work to the Bengal Drawing Office in instalments. The total number of sheets amounted to 6,648, but as the Bengal Drawing Office could not, owing to want of plant, deal with these fast enough, it was decided to reproduce 4,429 sheets and provide the usual traces for the remainder. During the year under report 2,873 sheets have been reproduced and 5,558 copies despatched to the camps concerned. The balance of 1,556 sheets will be completed during October except a few of district Backergunge which are not required by the Settlement Officer until January 1905. As all the season's work was mapped on the new kind of paper, the reproductions were made direct without the intervention of the trace which is necessary with the old kind of thick paper. This procedure is more economical than tracing and as it is purely mechanical no examination is required. Two or three copies are supplied to the attestation camps so that the "badar" corrections can be carried out by the Surveyor Munsarims on one copy. All these copies are stamped "Not final" in order to prevent any danger of their being mixed up hereafter with the copies of the finally corrected sheets which will be supplied later on in the usual course.

The reproductions were on the whole satisfactory, but a considerable number are too faint. This is due to the fact that the original sheets are inked up in the field by the "Amins" and not by experienced draftsmen. The ink used was also not uniform, but instructions on these points have been issued and a considerable improvement is anticipated next season.

In addition to the amount of work already detailed, this section undertook the re-examination and correction of reproduced copies of the Chittagong

maps. Some discrepancies were discovered in the Bengal Drawing Office between some of the copies and the original paper traces and as this threw doubt on the whole work, the Collector was asked to send one copy of each sheet back. Out of the total of 2,949 sheets which were carefully examined with the original paper traces, in only 16 cases was it found necessary to make reproductions. The remaining 2,933 sheets were corrected when necessary by a special establishment engaged for the purpose. These discrepancies were all due to touching up the zinc plates, a procedure which has been strictly forbidden for the past two years, so there is no fear of other districts being similarly affected.

The Collector of Chittagong has also been supplied with 10 copies of 98 jungle sheets, which were not reproduced before, along with the general Chittagong programme.

The work of the Reproduction Section has increased tremendously during the year under report and now that copies of a village map can be turned out at an average cost of little over one anna it is probable that the work will still further increase. At present all the printing is done by hand-presses, but it is proposed to purchase a press to be driven by electricity. With the hand-presses it is found difficult to obtain more than 100 good copies of a map from the same zinc plate, but with a machine, owing to its absolutely uniform inking, the number of copies that can be taken is practically unlimited.

Bihar Badar Section.

38. During the year 139 "Badars" of districts Muzaffarpur, Saran, Darbhanga, Patna, Monghyr, Purnea, Gaya, and Bhagalpur were received, which, with the balance of 3 from last year, gives a total of 142. Of these, 139 have been dealt with. The remaining 3 are in connection with the villages at the junction of the Ganges and Gandak Rivers, and as soon as the Settlement Department assign new numbers to the portions transferred from Saran to Muzaffarpur these can be completed. The following amount of work was also done by this section, viz. correction of headings of 6,057 sheets and names of adjoining villages on 6,796 sheets of Saran and Muzaffarpur in accordance with the correct spelling as given in the Thana List. The settlement areas of 1,343 villages of Muzaffarpur have been compared with the Universal Theorem areas and all discrepancies notified to the Settlement Officer of Bihar.

Orissa Badar Section.

39. The names of 11,923 villages in the traverse volumes have been corrected in accordance with the Thana List and 11,479 village names have been corrected in the field books.

The headings of 2,620 sheets have also been corrected and Thana Lists, which now take the place of the old Alphabetical list, have been prepared for 14,302 villages.

There is enough work remaining to employ this section until the end of December 1904, after which the establishment will be absorbed into the general Bengal "Badar" Section, which will deal with the "Badars" of Bihar, Chota Nagpur and Eastern Bengal.

Map-record Section.

40. The two large special double racks referred to in paragraph 31 of last year's report were completed early in the year now under report and 14,846 original Cadastral maps were taken over from the Map Record and Issue Office of the Survey of India. Also 4,983 maps were received from the field parties for custody and 4,533 sheets for reproduction passed through this section.

The Map Record and Issue Office was not able to hand over the whole stock of Bengal maps at once and there are still a few to be taken over. The Surveyor General and Deputy Surveyor-General inspected this section and expressed their approval of the racks and arrangement of registers.

The following items of miscellaneous work have been undertaken by the Bengal Drawing Office, viz., correction of the sheets of the Jaipur estate in district Bogra and preparation of maps showing the position of permanently marked trijunction points.

41. As no "Badars" of the Jaipur estate had ever been carried out on the original sheets, it was necessary to obtain the settlement traces and correct the original sheets in accordance therewith before the reproduction work could be started. A special establishment had to be engaged for this work. Out of 152 traces received from the Director of Land Records, the corrections of 24 only have been completed entirely. The alterations are so numerous and often of such a complicated nature that frequent references to the Deputy Collector in charge have been necessary. As soon as this work is completed the reproduction can be undertaken and completed within a month.

42. The preparation of maps on the scale of 1 inch=1 mile showing all permanently marked trijunctions was ordered in Board's Revenue Circular No. 7 for February 1903. Acommencement has been made with districts Patna, Gaya and Shahabad. These districts have only been partially surveyed and in Gaya and Patna the surveys were of a very scattered nature, and as the several blocks had not been connected, their relative positions could not be ascertained by means of co-ordinates deduced from one origin. It was therefore necessary to plot each block separately on the 1-inch scale showing the true trijunctions and permanently marked traversed trijunctions by different symbols and then transfer these by means of a trace to the existing standard maps. Out of an approximate programme of 4,695 villages, the 1-inch plots and traces with symbols of 3,305 have been completed.

CHAPTER III.

PART I.—TOURS OF SUPERINTENDENT, PROVINCIAL SURVEYS.

43. I have been in the field and on tour for 207 days. I visited each section of the Bengal Surveys on an average twice during the field season and again at least once during my monsoon tour of inspection.

PART II.—SERVICES OF OFFICERS.

44. Captain F. C. Hirst, I.A., acted for me for five weeks while I was on leave and was in charge of the Bihar Traverse Section until the endof March when he proceeded home on leave. Captain Hirst has worked very satisfactorily.

Lieutenant L. C. Thuillier, I.A., was placed in charge of the Bihar Traverse Section for the last part of the field season and throughout recess. Lieutenant Thuillier shows interest in his work and promises to become a capable Survey Officer.

Mr. A. W. Smart has, as usual, done remarkably well. The section under his charge completed by far the largest outturn ever accomplished by any Cadastral Camp of the Revenue Branch of the Survey of India. The Surveyor-General has shown his appreciation of Mr. Smart's work by selecting him for special promotion during the year.

Mr. C. S. Kraal, in charge of the other Bihar Cadastral Camp, has done well and completed a large programme satisfactorily.

Mr. N. Bedford in charge of the Backergunge Cadastral Survey, has done remarkably well. Mr. Bedford is a thoroughly capable and reliable officer and the great reduction in cost rates and general improvement in the work speak strongly in his favour.

Mr. E. F. Berkeley, in charge of the Bengal Drawing Office, has had a hard year's work and has worked to my entire satisfaction.

The remaining officers in charge of sections, viz., Messrs. T. W. Babonau, W. Skilling, C. S. Gasper and C. H. C. Johnson are all deserving of commendation.

The Assistants and Supervisors, with one or two exceptions, which have been reported to and dealt with by the Surveyor-General, have all worked well and afforded loyal support to the officers in charge of their camps.

Mr. R. B. Smart (a retired officer of the Department) who is in charge of the Calcutta Suburbs Survey, has done good work.

I have the honour to be,

SIR,

Your most obedient servant,

R. T. CRICHTON, MAJOR, I.A.,

Superintendent, Provincial Surveys in Bengal.

APPENDIX I—PART A.

Summary of the cutturn of work of the Survey Parties in Bengal, for 1903-1904.

DISTRICT.	TRAVERSING.					CADASTRAL SURVEY.				RECORD-WRITING.		TOPOGRAPHICAL SURVEY.
	Number of villages.	Linear miles of chaining.	Number of stations at which the theodolite was set up.	Number of Azimuths.	Number of sub-traverses.	Villages.	Fields.	Linear miles of test survey.	Sheets.	Villages.	Fields.	Villages.
1	2	3	4	5	6	7	8	9	10	11	12	13
Government Estates.												
Midnapur, Majnamutha &c.	77	102	852	2	18	1,678	535,936	2,845	1,894	1,281	426,740	...
Private Estates.												
Bhagalpur.—Traverse for topographical.	(a)232	271	935	29	...	...	...	...	...	...	...	(a)232
Ditto Ordinary	120	1,016	5,096	...	369	188	128,837	1,415	401	187	133,702	...
Purnea.—Traverse for topographical.	94	119	648	17	...	...	...	...	...	...	...	94
Ditto Ordinary	2,465	8,431	48,582	206	2,890	1,193	832,151	7,722	2,252	1,193	832,151	...
Backergunge	951	3,214	26,041	150	840	898	582,693	3,745	1,558	904	599,054	...
Ranchi	410	2,453	22,443	184	823	559	515,951	2,712	1,092	599	559,089	...
Singhbhum—Serai Kela, and Kharsawan.	912	2,128	17,652	100	697	...	...	...	...	...	...	...
Miscellaneous.												
Calcutta Suburbs Survey ...	...	119	3,756	...	...	...	(b)6,939	...	...	...	(b)6,939	...
Bhagalpur (Municipality) ...	3	15	295	...	25	121	33,371	57	44	121	33,371	...
Monghyr Municipality	21	55	1,248	...	117	21	18,266	47	22	21	18,266	...
Champaran—Karauli & Bhasauli	1	7	33	...	...	...	...	...	...	...	...	...
Monghyr—Darobust	1	1	6	...	...	...	...	...	...	...	...	...
Darbhanga—Chaparsan ...	1	12	26	...	1	1	656	15	10	1	656	...
Ditto Rosera Municipality.	...	...	...	...	...	1	510	...	13	1	4,784	...
Patna—Ghora urf Katora ...	1	1	8	...	...	...	...	...	...	...	...	...
Ranchi—Ranchi-Singhbhum boundary.	...	12	155	1	2	...	...	...	...	...	...	...
Do. Churya Estate ...	1	8	39	...	2	...	...	...	...	...	...	...
Chota Nagpur—Udaipur boundary.	...	151	1,244	46	...	...	...	...	...	...	...	...
Midnapur Cantonments ...	...	...	...	...	...	2	3,000	...	...	...	...	...
Total ...	5,290	18,115	128,959	735	5,784	4,662	2,658,310	18,558	7,286	4,308	2,614,752	326

(a) Includes 5 villages of the Sonthal Parganas.
(b) Holdings demarcated.

R. T. CRICHTON, MAJOR, I.A.,

Superintendent of Provincial Surveys in Bengal.

APPENDIX I—PART B.

Statement of Outturn and Cost-rates.

District and Estate.	Description of work.	Estimated area to be dealt with in square miles.	Year of inception of operation.	Area surveyed in square miles. During the year under report.	Area surveyed in square miles. Total including previous years.	Cost-rate per square mile. During the year under report.	Cost-rate per square mile. From beginning to end of the year under report.	Balance of area remaining to be surveyed.	Estimated cost of completing the area in column 9.	Estimated final cost rate per square mile.	Remarks. [Explanation of unusually high expenditure.]
1	2	3	4	5	6	7	8	9	10	11	12
Government Estates.						Rs.	Rs.	Rs.	Rs.	Rs.	
Midnapur—Majnamutha and Jalamutha.	Traverse	677	1903	22	677	84·3	39·9	Nil	Nil	40·0	Scattered and detached areas.
	Cadastral	642	1904	621	621	170·0	170·0	21	34,050	170·0	
	Records	621	1904	486	486			135			
Private Estates.											
Bhagalpur	Traverse	1,836	1901	168	1,835	35·8	27·2	Nil	Nil	27·2	
	Cadastral	1,897	1902	275	1,897	56·6	61·2	Nil	Nil	61·2	
	Records	1,876	1902	282	1,876	26·1	64·4	Nil	Nil	64·4	
	Traverse for topographical.	463	1903	(a)300	(a)300	25·6	25·6	163	1,950	20·8	
	Topographical ...	463	1903	(a)297	(a)297	16 8	16·8	166	2,450	16·1	
Purnea	Traverse	4,383	1900	1,997	3,916	26·6	28·1	467	12,600	27·9	
	Cadastral	(d)3,599	1901	1,499	1,499	64·9	64·9	2,100	1,47,000	67·9	
	Records	(d)3,599	1901	1,499	1,499	36·6	36·6	2,100	1,05,000	44·4	
	Traverse for topographical.	423	1903	183	183	16·4	16·4	240	2,880	13·9	
	Topographical ...	406	1903	166	166	13·5	13·5	240	2,880	12·6	
Backergunge	Traverse	3,368	1900	843	3,168	57·1	55·4	200	11,400	55·5	
	Cadastral	3,032	1901	(b)876	2,052	96·5	129·7	980	98,000	120·1	
	Records	3,046	1901	(b)963	2,066	30·9	57·3	980	39,200	51·5	
Ranchi	Traverse	7,128	1901	861	2,293	32·0	36·0	4,835	1,45,050	31·9	
	Cadastral	7,128	1902	748	1,365	57·8	59·5	5,763	3,45,780	59·9	
	Records	7,128	1902	801	1,238	35·4	34·3	5,890	2,35,600	39·0	
Singhbhum—Serai Kela and Kharsawan	Traverse	600	1903	600	600	33·6	33·6	Nil	Nil	33·6	
Miscellaneous.											
Calcutta Suburbs Survey	Traverse	17	1903	7	13	...	...	4	1,12,000	...	
	Cadastral	17	1903	9	13	...	...	4		...	
	Records	17	1903	8	8	...	...	9		...	
Bhagalpur Municipality	Traverse	12	1903	3	12	...	...	...	...	...	
	Cadastral	12	1904	12	12	...	...	...	...	...	
	Records	12	1904	12	12	...	...	...	...	...	
Monghyr Municipality	Traverse	6	1904	6	6	...	...	...	...	...	
	Cadastral	6	1904	6	6	...	...	...	...	...	
	Records	6	1904	6	6	...	...	...	...	...	
Champaran—Mauza Karaulia Bhasauli	Traverse	4	1903	4	4	...	...	...	...	...	
Monghyr—Darobus	Do.	20	1903	20	20	...	...	...	...	...	
	Do.	7	1903	7	7	...	...	...	...	...	
Darbhanga Chaparsan	Cadastral	7	1903	7	7	...	...	...	...	...	
	Records	7	1903	7	7	...	...	...	...	...	
Ditto (Rosera Municipality) ...	Cadastral	1	1903	1	1	...	...	...	...	...	
	Records	1	1903	1	1	...	...	...	...	...	
Patna—Ghora urf Katora	Traverse	5	1904	5	5	...	...	...	...	...	
Ranchi—Churya Estate	Do.	2	1904	2	2	...	...	...	...	...	
Total and average of columns 7, 8 and 11.	Traverse	18,950	...	5,028	13,041	33·7	36·7	5,909	...	...	
	Cadastral	16,341	...	4,054	7,473	74·4	33·3	8,868	...	...	
	Records	16,313	..	4,065	7,199	33·9	49·3	9,114	...	...	
	Topographical ...	869	...	463	463	15·7	15 7	406	...	...	

(a) Includes 10 square miles of Sonthal Parganas.
(b) Excludes 150 square miles of river and water area.
(c) Incomplete rates.
(d) Excludes Surjapur Pargana.

R. T. CRICHTON, MAJOR, I.A.,

Superintendent of Provincial Surveys in Bengal.

APPENDIX II.

Statement of sums expended.

District, &c.	Description of work.	Expenditure incurred during the year under report.				Total expenditure from inception to end of the year under report.			
		Actual (direct) cost.	Share of Superintendent, Provincial Surveys' pay and cost of his office.	Four per cent. charge for instruments.	Total.	Actual (direct) cost.	Share of Superintendent, Provincial Surveys' pay and cost of his office.	Four per cent. charge for instruments.	Total.
1	2	3	4	5	6	7	8	9	10
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Government Estates.									
Midnapur—Majnamutha, Jalamutha, etc.	Traverse	1,760	95	...	1,855	25,226	1,818	...	27,044
	Cadastral	54,205	2,950	2,285	59,440	54,205	2,950	2,285	59,440
	Records	14,668	797	618	16,083	14,668	797	618	16,083
Private Estates.									
Bhagalpur	Traverse	5,486	296	231	6,013	45,065	2,881	1,917	49,863
	Cadastral	14,208	768	599	15,575	1,03,347	7,308	4,426	1,15,081
	Records	6,725	363	283	7,371	1,08,401	7,821	4,648	1,20,870
	Traverse for Topographical.	7,005	377	295	7,677	7,005	377	295	7,677
	Topographical ...	4,572	248	193	5,013	4,572	248	193	5,013
Purnea	Traverse	48,481	2,627	2,044	53,152	99,131	6,622	4,229	1,09,982
	Cadastral	88,782	4,820	3,744	97,346	88,782	4,820	3,744	97,346
	Records	50,056	2,715	2,111	54,882	50,056	2,715	2,111	54,882
	Traverse for Topographical.	2,745	151	116	3,012	2,745	151	116	3,012
	Topographical ...	2,050	110	86	2,246	2,050	110	86	2,246
Backergunge	Traverse	43,907	2,375	1,851	48,133	1,58,136	10,735	6,753	1,75,624
	Cadastral	76,229	4,115	3,213	83,557	2,40,888	15,054	10,236	2,66,178
	Records	27,131	1,467	1,144	29,742	1,07,226	6,842	4,563	1,18,631
Ranchi	Traverse	25,105	1,365	1,058	27,528	75,695	4,773	2,061	82,529
	Cadastral	39,414	2,141	1,660	43,215	73,498	4,643	3,123	81,264
	Records	25,871	1,414	1,091	28,376	38,511	2,341	1,634	42,486
Singhbhum—Serai Kela and Kharsawan.	Traverse	19,133	1,045	...	20,178	19,133	1,045	...	20,178
Miscellaneous.									
Calcutta Suburbs Survey	Traverse	18,209	982	...	19,191	26,627	1,599	...	28,226
	Cadastral	42,943	2,338	...	45,281	63,529	3,849	...	67,378
Bhagalpur Municipality	Traverse	281	13	12	306	1,581	108	68	1,757
	Cadastral	6,065	326	256	6,647	6,089	328	257	6 674
	Records	1,106	58	46	1,210	1,106	58	46	1,210
Monghyr Municipality	Traverse	960	50	40	1,050	960	50	40	1,050
	Cadastral	1,486	77	62	1,625	1,486	77	62	1,625
Champaran—Karaulia Bhasauli ...	Traverse	200	10	8	218	200	10	8	218
Monghyr—Darobust	Do.	364	17	15	396	782	47	33	862
Darbhanga—Chaparsan	Traverse	210	11	9	230	210	11	9	230
	Cadastral	424	22	18	464	424	22	18	464
	Records	219	10	9	238	219	10	9	238
Ditto Rosera Municipality ...	Cadastral	171	8	7	186	797	54	34	885
	Records	60	3	2	65	60	3	2	65
Patna Ghora urf Katora ...	Traverse	128	6	6	140	128	6	6	140
Ranchi—Ranchi-Singhbhum Boundary	Do.	170	8	...	178	170	8	..	178
Chota Nagpur—Udaipur State boundary.	Do.	1,718	92	72	1,882	1,718	92	72	1,882
Bhagalpur Badars	Cadastral	4,796	259	202	5,257	4,796	259	202	5,257
Purnea Badars of Surjapur Pargana...	Do.	929	49	39	1,017	5,395	378	231	6,004
Backergunge Badars	Do.	87	4	4	95	87	4	4	95
Ranchi Training School	Do.	730	36	30	796	1,591	99	67	1,757
Total ...	Traverse	1,75,862	9,520	5,757	1,91,139	4,64,512	30,338	15,607	5,10,462
	Cadastral	3,30,469	17,913	12,119	3,60,501	6,44,914	39,845	24,689	7,09,448
	Records	1,25,836	6,827	5,304	1,37,967	3,20,247	20,587	13,631	3,54,465
	Topographical ...	6,622	358	279	7,259	6,622	358	279	7,259
Bengal Drawing Office	Standard maps ...	13,409	734	...	14,143	41,670	2,771	...	44,441
	Thana maps ...	1,144	60	...	1,204	4,775	327	...	5,102
	Reproduction of village maps.	47,208	2,580	...	49,788	1,20,024	7,836	...	1,27,860
	Map record section	6,810	370	...	7,180	6,810	370	...	7,180
	Bihar Badars ...	1,545	82	...	1,627	6,917	464	...	7,381
	Orissa Badars ...	1,249	66	...	1,315	7,003	516	...	7,519
Grand Total ...		7,10,154	38,510	23,459	7,72,123	16,23,494	1,03,407	54,206	17,81,107

R. T. Crichton, Major, I.A.,

Superintendent of Provincial Surveys in Bengal.

B. S. Press—3087J—350 16 1·1905 J. T. C.

REVENUE DEPARTMENT.

LAND REVENUE.

CALCUTTA, THE 13TH MARCH 1905.

RESOLUTION—No. 1458.

READ—

The Survey and Settlement Reports for the year ending the 30th September 1904, with the remarks of the Board of Revenue thereon.

The submission of the Settlement Report of the Director of Land Records was delayed for over a month by the necessity of obtaining fresh statistics for its appendices in certain modified forms the introduction of which was unavoidably delayed. Both the Survey and Settlement Reports have been written concisely and in general conformity with the orders of Government.

2. During the year, the work of the Survey and Settlement Departments in Bengal extended over portions of fifteen districts comprised in eight Divisions, exclusive of certain municipal and other minor areas, and of the Political States of Kharsawan and Seraikela in Chota Nagpur the survey and settlement of which have been undertaken at the request of the Chiefs. With a few trifling exceptions, the programme, which was large, was carried out completely. The traverse survey covered a total area of 5,028 square miles as against 6,884 square miles in the year 1902-1903; but the area cadastrally surveyed (5,044·77 square miles) exceeded the previous year's outturn by 1,325·77 square miles, while an additional area of 463 square miles was surveyed topographically. Up to the close of the period covered by the present Reports, a record-of-rights had been framed, under the supervision of the Director of Land Records, in respect of 35,231 square miles out of the 151,185 square miles which form the total area of British territory in the Province. The progress during the last 18 years has averaged 1,957 square miles *per annum*; but the area completed in the year 1903-1904 amounted to 2,749 square miles, and the recent expansion of the unit of operations to be carried out by each Survey and Settlement party will result in yet more rapid progress in future.

3. Both Reports present a year's record of successful administration, and the Lieutenant-Governor is glad to notice that, as observed by the Board, Major Crichton continued to keep prominently before him the object of securing all economy possible without impairing the efficiency of the work. As indicated by the figures noted in the margin, the cost rates of traverse survey were slightly higher than in the previous year in all the larger operations. His Honour is, however, satisfied that, in the circumstances stated in paragraphs 13, 16, 19 and 21 of the Survey Report, the rates could not well have been lower. As regards cadastral survey and initial record-writing, which are by far the most expensive items of survey work, the cost rates per square mile in Bhagalpur, Backergunge and Ranchi were, respectively, Rs. 82·7, Rs. 130, and Rs. 93·2 as against Rs. 132·5, Rs. 167·7, and Rs. 94 in the previous year. The reduction is stated to be due mainly to larger fields and the acquisition of experience by the staff. Sir Andrew Fraser agrees with Major Crichton that the cost rate of Rs. 101·5 for cadastral survey and initial record-writing in the district of Purnea is a very low rate, considering the fact that the district is very unhealthy; and His Honour notices with satisfaction that the Managers of the Darbhanga and Banaili estates in this district gave ready assistance to the Survey Department in obtaining coolie labour with regard to which

DISTRICT.	Cost rate of traverse survey per square mile.	
	1902-03.	1903-04.
	Rs.	Rs.
Bhagalpur ...	26·6	35·8
Purnea	24·3	26·6
Backergunge ...	43·6	57·1
Ranchi	28·9	32·0

considerable difficulty was experienced at the outset. The exceptionally low cost rate of cadastral survey and initial record-writing in Ranchi was due in a great measure to the fact that the people continued to supply labour free of charge. This is very satisfactory, inasmuch as, owing to the poverty of the country and the people, economy is of special importance in Chota Nagpur.

4. In paragraphs 67, 71 and 72 of the Settlement Report the Director of Land Records refers to a deplorable state of things in the district of Ranchi. Of the number of holdings the records of which were attested during the year, 16 per cent. are held by non-occupancy raiyats. The total number of tenures recorded was 17,152, of which 5,906 were holdings of occupancy raiyats and 2,782 of non-occupancy raiyats. This unduly high proportion is attributable mainly to the existing tenancy law of Chota Nagpur, under which no raiyat can acquire a right of occupancy in a plot of land unless he has cultivated or held that particular plot for a period of 12 continuous years. An amendment of the law cannot be undertaken until sufficient materials for a definite decision have been collected by means of the survey and settlement operations now in progress; but the Lieutenant-Governor hopes that those operations will effect some improvement in the condition of the raiyats in the meantime. The other matters referred to by the Director, viz., the subversion of the rights of the Mundas under the cloak of the law, and the consequent want of confidence in the law courts on the part of the aboriginal population, engaged the Lieutenant-Governor's attention during his visit to Ranchi in September 1904. The whole subject was fully discussed by His Honour with the local officers and the Rev. Father Hoffmann, S.J., Missionary at Sarwada, who is admittedly one of the best living authorities regarding the religion and customs of the Mundas. With regard to the possibility of remedying the evil already done, the Lieutenant-Governor awaits a joint report from the Commissioner of Chota Nagpur and the Settlement Officer of Ranchi. As regards the prevention of injury to the raiyats in future, it is to be noted that one of the main objects with which the settlement of the district had been undertaken was to ascertain and maintain the rights of the Mundas. It appeared to His Honour, therefore, that the principal preventive measure should be to provide against the settlement becoming fruitless and nugatory owing to the courts remaining ignorant of, or in any way antagonistic to, its results. Steps have accordingly been taken for the instruction of Deputy Magistrates and of officers subordinate to the Judicial Commissioner of Chota Nagpur in the nature and value of the settlement records, and for the regular supply of information to these officers as to the progress of the settlement in every part of the district. At the request of His Honour Mr. Carnduff, late Judicial Commissioner of Chota Nagpur, has also brought out an annotated edition of the Chota Nagpur Landlord and Tenant Procedure Act, which furnishes an authoritative account of the history and nature of the Mundari tenures; and this will, it is hoped, lead to more satisfactory decisions of cases in future.

5. In the course of the settlement proceedings in Ranchi, considerable difficulty was experienced in the identification of the lands surveyed under the Bhuinhari Act, II (B.C.) of 1869, as the *bhuinhara* maps never exactly coincide with the actual field boundaries of the present survey. The procedure adopted by the Settlement Department to eliminate the discrepancies, as stated in paragraph 66 of the Director's Report, appears to the Lieutenant-Governor to be satisfactory.

6. In North Bhagalpur the task of the Settlement Department was beset with special difficulties, inasmuch as many landlords had enhanced rents in contravention of the provisions of section 29 of the Bengal Tenancy Act. Similar instances having come to light elsewhere, Government has now under consideration an amending Bill intended to remove the defects in the law which render such contravention possible.

7. In paragraph 4 of the Resolution on the Survey and Settlement Reports for the year ending 30th September 1903, the Lieutenant-Governor had occasion to express his decided opinion that the trustworthiness of the record-of-rights should on no account be impaired by the appointment of kanungos and persons not previously in the service of Government to the responsible office of

an Assistant Settlement Officer. The Government of India have also expressed their strong disapproval of the employment of such agency, and the practice has been continued only because of the inadequacy of the Provincial and Subordinate Executive Services. It has now been finally decided that no one below the rank of a Sub-Deputy Collector shall be appointed to be an Assistant Settlement Officer, and steps have been taken to provide the requisite number of Deputy and Sub-Deputy Collectors. As soon as these have been provided kanungos and persons not previously in the service of Government will no longer be appointed Assistant Settlement Officers.

8. With regard to the question of *diara* surveys alluded to in paragraph 5 of the last year's Resolution, it has been decided that as riverain tracts will be surveyed in the course of the survey and settlement of each district, action should for the present be confined to keeping up to date the maps of *diara* lands so surveyed, and arrangements have been made for a beginning in the Patna Division.

9. The schemes for the maintenance of settlement records in North Bihar, Chittagong and Orissa are still under the consideration of the Government of India. The Settlement Report bears evidence of considerable improvement in the record of mutations and the maintenance of rent-rolls in Government and wards' estates. The Lieutenant-Governor has no doubt that the Board will take such steps as may be considered necessary for the proper performance of this important task where it is still backward.

10. The Lieutenant-Governor is much gratified to find that during the year there was an appreciable advance in the utilisation of settlement records. These records are prepared with immense trouble and at great expense; and if they are properly used and are given the weight which attaches to them under the law, they cannot fail to be of the greatest assistance in many branches of district administration, and to afford the protection which it is their primary object to ensure. Ignorance as to the nature of these documents and as to the mode of using them have been the main reasons why they have not hitherto been in such request as they should be. Suitable instructions have therefore been issued for the guidance of Executive Officers; and a scheme is now under consideration for giving Munsifs a training in settlement work in order that before entering upon the difficult duty of adjudicating on disputes connected with land, they may acquire a practical knowledge of the settlement procedure and records and of agrarian conditions generally.

11. Revised rules for the maintenance of boundary marks have only recently issued, but already there are signs of improvement in this matter; and, judging from this, the Lieutenant-Governor agrees with Mr. Maddox that a more efficient record and maintenance of these marks in future may well be looked for.

12. This short review would be incomplete without an expression of the Lieutenant-Governor's cordial appreciation of the services of Major R. T. Crichton and Mr. S. L. Maddox, who were in charge of the Survey and Settlement Departments respectively, and of those of the officers named in the concluding chapters of the two Reports. Sir Andrew Fraser fully agrees with what the Director of Land Records and the Board have said with regard to Mr. Beatson Bell, Settlement Officer, Backergunge, whom His Honour congratulates upon the smooth and successful carrying out of operations in a district which presented special difficulties. The Lieutenant-Governor's acknowledgments are also due to Messrs. McPherson, Lister and Coupland for the excellent work done by them.

ORDER.—Ordered that this Resolution be published in the *Calcutta Gazette*, and that a copy of it, with copies of the two Reports, be submitted to the Government of India.

By order of the Lieutenant-Governor of Bengal,

R. W. CARLYLE,

Offg. Chief Secretary to the Govt. of Bengal.

No. 1459.

COPY, with a copy of the Survey Report, forwarded to the Deputy Surveyor-General in charge, Revenue Branch, Survey of India, for information.

No. 1460.

COPY, with a copy of the Settlement Report, forwarded to the Appointment Department of this Government for information with special reference to paragraph 12 above.

By order of the Lieutenant-Governor of Bengal,

M. C. McALPIN,
Under-Secretary to the Govt. of Bengal.

CALCUTTA,
The 13th March 1905.

B. S. Press—8933C—850—21-3-1905—W.M. D'C.

ANNUAL REPORT

ON THE

SURVEY OPERATIONS IN BENGAL

DURING THE YEAR

1904-05.

GOVERNOR OF BENGAL.

From 1st October 1904 to 30th September 1905.

LIBRARY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC SOCIETY.

Calcutta:

THE BENGAL SECRETARIAT BOOK DEPÔT.

1905.

Published at the BENGAL SECRETARIAT BOOK DEPÔT,
Writers' Buildings, Calcutta.

OFFICIAL AGENTS.

In India—

MESSRS. THACKER, SPINK & Co., Calcutta and Simla.
MESSRS. NEWMAN & Co., Calcutta.
MESSRS. HIGGINBOTHAM & Co., Madras.
MESSRS. THACKER & Co., LD., Bombay.
MESSRS. A. J. COMBRIDGE & Co., Bombay.
THE SUPERINTENDENT, AMERICAN BAPTIST MISSION PRESS, Rangoon.
MRS. RADHABAI ATMARAM SAGOON, Bombay.
MESSRS. R. CAMBRAY & Co., Calcutta.
RAI SAHIB M. GULAB SINGH & SONS, Proprietors of the Mufid-i-am Press, Lahore, Punjab.
MESSRS. S. K. LAHIRI & Co., Printers and Booksellers, College Street, Calcutta.
MESSRS. V. KALYANARAMA IYER & Co., Booksellers, &c., Madras.
MESSRS. D. B. TARAPOREVALA, SONS & Co., Booksellers, Bombay.
MESSRS. G. A. NATESON & Co., Madras.
MR. N. B. MATHUR, Superintendent, Nazair Kanum Hind Press, Allahabad.
THE CALCUTTA SCHOOL BOOK SOCIETY.
MR. SUNDER PANDURANG, Bombay.
MESSRS. A. M. and J. FERGUSON, Ceylon.

In England—

MR. E. A. ARNOLD, 41 & 43 Maddox Street, Bond Street, London, W.
MESSRS. CONSTABLE & Co., 16 James Street, Haymarket, London, W.
MESSRS. KEGAN PAUL, TRENCH, TRÜBNER & Co., Charing Cross Road, London.
MR. B. ALFRED QUARITCH, 15 Piccadilly, London.
MESSRS. P. S. KING & SON, 2 & 4 Great Smith Street, Westminster, London.
MESSRS. H. S. KING & Co., 65 Cornhill, London.
MR. B. H. BLACKWELL, 50-51 Broad Street, Oxford.
MESSRS. DEIGHTON BELL & Co., Cambridge.

On the Continent—

MESSRS. R. FRIEDLÄNDER & SOHN, Berlin, N. W. Carlstrasse, 11.
MR. OTTO HARRASSOWITZ, Leipzig.
MR. KARL HIERSEMANN, Leipzig.
MR. ERNEST LEROUX, 28, Rue Bonaparte, Paris.
MR. MARTINUS NIJHOFF, The Hague.

[Maximum limit 94 pages, excluding appendices.]

INDEX TO CONTENTS.

CHAPTER I.

PAGE

GENERAL REMARKS ON THE PROVINCIAL SURVEYS 1

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND RECORDS OF RIGHTS IN TEMPORARILY-SETTLED AND GOVERNMENT ESTATES UNDER SETTLEMENTS OF RENTS AND LAND REVENUE.

BURDWAN DIVISION—MIDNAPORE DISTRICT—CADASTRAL SURVEY 3

PART II.—REPORTS ON SURVEYS AND RECORDS OF RIGHTS IN PRIVATE ESTATES.

BHAGALPUR DIVISION	BHAGALPUR DISTRICT	TRAVERSE SURVEY . . .	4
	„ „	CADASTRAL „ . . .	*ib.*
	„ „	TOPOGRAPHICAL „ . . .	*ib.*
	PURNEA „	TRAVERSE „ . . .	5
	„ „	CADASTRAL „ . . .	*ib.*
	„ „	TOPOGRAPHICAL „ . . .	*ib.*
DACCA „ ...	BACKERGUNGE „	TRAVERSE „ . . .	*ib.*
	„ „	CADASTRAL „ . . .	*ib.*
	„ „	SUNDARBANS TRAVERSE SURVEY . .	6
	„ „	„ TOPOGRAPHICAL SURVEY .	7
	FARIDPUR „	TRAVERSE SURVEY . . .	*ib.*
CHOTA NAGPUR „ ...	RANCHI „	TRAVERSE „ . . .	8
	„ „	CADASTRAL „ . . .	*ib.*
	SINGHBHUM „	CADASTRAL „ . . .	*ib.*

PART III.—REPORTS ON MISCELLANEOUS SURVEYS.

PRESIDENCY DIVISION	—24-PARGANAS—CALCUTTA SUBURBS SURVEY . . .	9
BHAGALPUR „	—MALDA DISTRICT	10
PATNA „	PATNA „	*ib.*
	„ DIVISION—DIARA SURVEY	*ib.*
CHOTA NAGPUR „	RANCHI DISTRICT	11
	UDAIPUR STATE	*ib.*
RAJSHAHI „	—JALPAIGURI—COOCH BEHAR BOUNDARY	*ib.*

PART IV.—REPORT ON THE BENGAL DRAWING OFFICE.

STANDARD MAPPING SECTION 12
THANA MAPPING SECTION 13
REPRODUCTION OF VILLAGE MAPS . . . . . *ib.*
BADAR SECTION 14
MAP RECORD SECTION 15

CHAPTER III.

PAGE

PART I.—TOURS OF SUPERINTENDENT OF PROVINCIAL SURVEYS . . . 15

PART II.—SERVICES OF OFFICERS . . . . . *ib.*

LIST OF APPENDICES.

APPENDIX I.—PART A.—SUMMARY OF OUTTURN OF WORK 17

PART B.—STATEMENT OF OUTTURN AND COST RATES . . . 18

„ *II.*—EXPENDITURE STATEMENT 19

LIST OF INDEX MAPS.

PROVINCE OF BENGAL . . . . . *To face page* 1

MIDNAPORE DISTRICT . . . . . „ „ 3

BHAGALPUR „ . . . . . „ „ 4

PURNEA „ . . . . . „ „ 5

BACKERGUNGE „ . . . . . „ „ 6

FARIDPUR DISTRICT . . . . . „ „ 7

RANCHI „ . . . . . „ „ 8

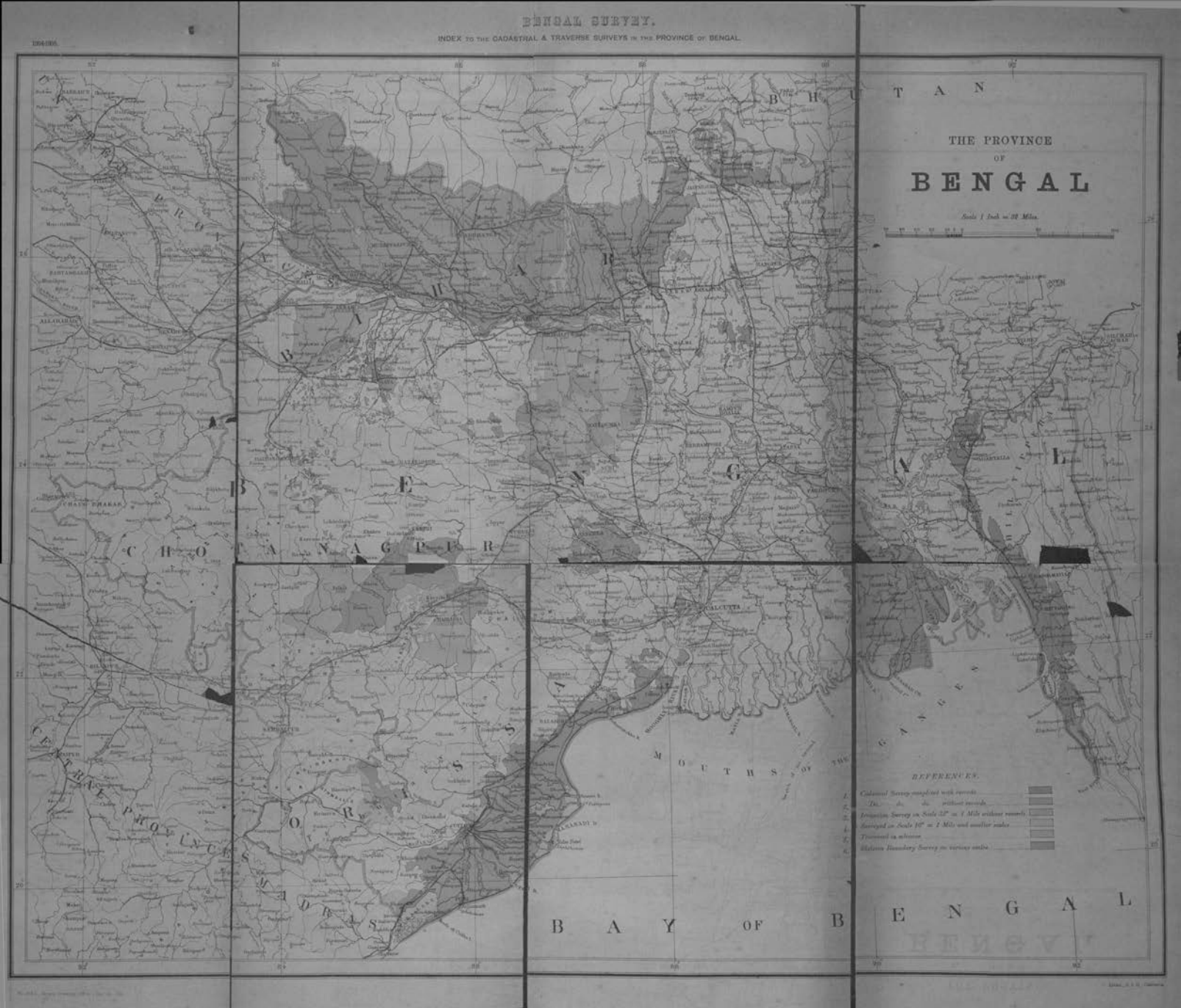
SINGHBHUM „ . . . . . „ „ 9

CITY OF CALCUTTA . . . . . „ „ *ib.*

BENGAL SURVEY.

INDEX TO THE CADASTRAL & TRAVERSE SURVEYS IN THE PROVINCE OF BENGAL.

1304-1305.



CORRECTION SLIP.

Page 4, paragraph 30, last line—*For* 10° 36′ East *read* 1° 36′ East.

ANNUAL REPORT OF

THE SUPERINTENDENT OF PROVINCIAL SURVEYS, BENGAL,

ON THE

SURVEY AND RECORD-OF-RIGHTS OPERATIONS IN BENGAL

DURING THE YEAR 1904-1905.

No. $\frac{3250}{R/7\text{-}60}$

FROM MAJOR R. T. CRICHTON, I.A.,

Superintendent of Provincial Surveys in Bengal,

TO THE SECRETARY TO THE BOARD OF REVENUE, L. P.

Dated Dinapore, the 18th November 1905.

SIR,

I HAVE the honor to submit the report on the survey operations in Bengal during the past survey year, namely from 1st October 1904 to 30th September 1905.

2. I have been in charge for the whole period under report.

CHAPAER I.

GENERAL REMARKS.

3. The outturn of the year namely 6,326 square miles of traverse survey, 4,481 square miles of cadastral survey, 4,512 square miles of record-writing and 572 square miles of topographical survey is larger than that of last season.

The full programme of the year has been worked up to in every respect, in fact generally exceeded, except the programme in the Sundarbans of the 24 Pergunnas which had to be postponed until next season owing to late receipt of orders and difficulty in obtaining boats.

Changes during the year.

4. An important change in the organization of the Bengal Surveys has been effected during the year under report. In previous seasons the Bengal Surveys consisted of one full party comprising one large traverse camp and two cadastral camps in Bihar and a number (gradually increasing year by year as the programme increased) of detachments, each about the strength of one of the Behar camps, in Chota Nagpur and Eastern Bengal. These detachments, augmented when necessary, have been formed into parties and the surveys of the past season have been carried out by 3 full parties, *viz.*, No. 4 (Bihar,) No. 5 (Chota Nagpur) and No. 6 (Eastern Bengal) each under an Executive Officer. In addition to these, there are also under my control, the Bengal Drawing Office at Calcutta and the Calcutta Suburbs Survey detachment.

5. There have been several minor changes in procedure, but none of sufficient importance to warrant mention in this report except perhaps the supply to applicants of copies of maps reproduced by the vandyke process, instead of the usual traces on vellum.

6. The Bengal Drawing Office has been moved from Free School Street to larger and more suitable quarters in the Lower Circular Road. This is reported on in detail in Part IV of the report.

7. On the 31st May a conference, presided over by the Hon'ble Member, at which the Chief Secretary was present, was held at Darjeeling to consider a joint note put up by the Director of Land Records and myself proposing that the control of cadastral surveys and record-writing be in future handed over by the Survey Department to the Settlement. It was agreed that as the Settlement Department had by now, owing to its 14 years constant close relationship with the Survey Department, become properly imbued with the importance of maintaining the detail survey at the same standard of accuracy as the professional parties and as a large trained Settlement Staff was now available, the maintenance of the present system of dual control was no longer necessary or advisable. As a consequence of a further conference, at which the Deputy Surveyor-General was also present it was decided that the Survey Department should continue to do all traverse work wherever required but only retain the cadastral survey and record-writing in Behar. The Government of India have accorded their approval to these proposals taking effect from 1st October 1905. Although this will shortly lessen the pressure on the Survey Department it has of course materially added to its work during the year under report, as arrangements for handing over establishments, equipment and instruments, have had to be made and two training classes established at Ranchi and Titaghur.

Ranchi Training School.

8. In accordance with the recommendation of the conference referred to in the foregoing para. a number of Settlement Officers were put through a course of training in cadastral surveying, checking same, system of accounts and general procedure of a cadastral camp.

The class at Ranchi which was conducted by Captain F. C. Hirst commenced on 18th July.

The following officers attended the class: Messrs. Lister, Reid, Jack, and Milligan of the Indian Civil Service. Mr. Hodson, Deputy Collector, Babus Surendra Nath Sen, Brij Nath Rai, Promoda Chander Sen, Suresh Chander Deb, Srimohan Das Gupta, Lalit Kumar, Maulvi A. K. Kaviruddin Ahmed and Pandit Raj Ballabh Misra.

9. The class has not been a complete success. In the first place the time of year is not suitable for the prosecution of any field work. This of course could not be avoided as it was only decided in June that the training class was to be held and it had to be completed before October. Again several officers were unable to stay at Ranchi for the 2½ months the course was supposed to last: this necessitated the division of the class into two portions one of which was "crammed" and the other put through in accordance with the directions which I had drawn up. Captain Hirst also complains that several officers who attended were not placed entirely at his disposal but were apparently also under the orders of the Settlement Officer of Ranchi and were employed also on other duties.

Titagarh Training School.

10. The Training School at Titagarh, which was supervised by Mr. A. W. Smart, Extra Deputy Superintendent in charge of No. 6 party was supposed to commence on 15th July, but the officers deputed to join this school, joined at varying dates from the 17th July to 23rd September.

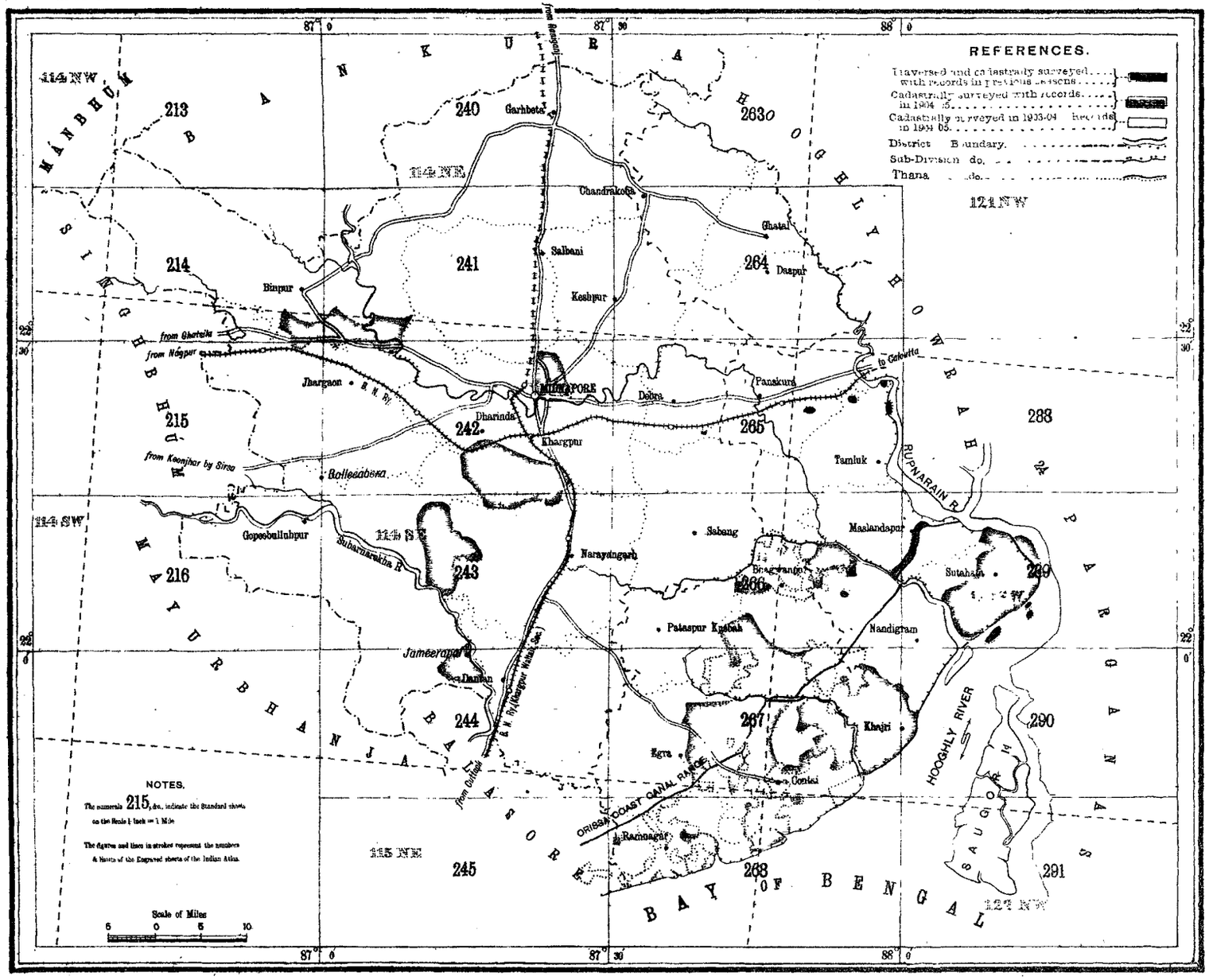
11. The fourteen Assistant Settlement Officers and twenty Kanungoes who attended the school were formed into 10 classes each in charge of an Inspector and the work was supervised and inspected by two Survey Officers.

12. The course for each officer was intended to comprise 150 acres of cadastral survey, 10 linear miles of test survey, instruction in inking up of maps, area extraction, completion of records and statistics, also accounts and returns so as to give a fair idea of all the work of a cadastral camp.

13. The latter half of July was taken up in instruction in the use of scales and plotting from field books. The field work then commenced, but owing to the country being under water and fever being prevalent, only the

BENGAL SURVEY.

1904-05. **INDEX TO THE CADASTRAL SURVEY IN DISTRICT MIDNAPORE.** No. 5 PARTY.



No. 834 E., B. D. O.—[illegible] 5...

Photo. S. I. O., Calcutta.

survey and a portion of the test surveys were completed by the Puja holidays. The Settlement Department then requested that the remainder of the course might be finished at Barisal under Babu Nilmony Chatterji, Extra Assistant Superintendent whose services had been lent to the Settlement Department.

14. Mr. Smart reports that the Assistant Settlement Officers and Kanungoes have acquired a fair knowledge of cadastral survey and running "partal" lines and mentions the following as having done well:—

Assistant Settlement Officers, Ataur Rahman, Sital Chandra Chatterji, Rai Charan Pal, Kshiti Nath Ghose, Janaki Bhuson Singha, and Akhoi Kumar Mookerji; Kanungoes Madhu Sudan Das Gupta, Sridhar Mozumdar, Kamini Mohan Dutta and Surendra Nath Sen Gupta.

Training of Junior Civilians.

15. During the field season 12 Junior Civilians, *viz*, Messrs. A. H. Ley, W. H. Buchan, J. A. Milligan, C. J. Williams, H. K. Briscoe, W. S. Hopkyns. J. F. W. James, D. C. Patterson, S. H. Mackenzie, A. W. Barnicott, W. A. Cosgrave, and S. K. Ghose went through a course of training in traverse and cadastral surveying with No. 4 party (Behar). The four following Kanungoes also went through a course of training in traverse survey only; Babus Harendra Lal Dass, Kishun Parshad, Hengsa Parshad Roy, and Raj Kumar Lal Mukerjee.

Permanent marking of village trijunctions.

16 In accordance with the instructions contained in Appendix T. of the Survey and Settlement Manual, the cadastral camps have moved stones from traverse trijunction points to the true village trijunction points and embedded cylinders at the former so as to retain their traverse value

---

CHAPTER II.

Part I.—Reports on Surveys and Records of rights in temporarily settled and Government estates under settlement of rents and land revenue.

District Midnapore.

Cadastral Survey.

17. In para. 12 of last years report it was stated that 21 square miles of survey and 135 square miles of record writing remained to complete the programme in this District but during the course of the work it was found that 27 square miles had to be surveyed and 149 square miles "*khanapuried.*"

The work was undertaken by Mr. C. S. Gasper in charge of Camp 3 of No. 5 party (Capt. Hirst in charge.)

18. The area dealt with is very scattered, being comprised in no less than 21 Pergannahs. The low lying and water logged nature of the country was also a source of trouble, as work could not be commenced until March and had to be rushed through as fast as possible in order to finish before the villages went under water again.

19. Out of the area *khanapuried*, 45 villages comprising 63,863 fields were dealt with by the Settlement Officer direct but have been included in this report as the funds were provided by the Survey Department.

20. The survey was checked by 115 linear miles of re-survey which gives an incidence of 3·8 linear miles of test survey to each square mile of detail.

21. The entries against 40,193 plots were checked by the survey staff which gives an average of 16 per cent. This small average is due to the scattered programme and water logged nature of the country.

22. The small average size of the villages and fields is noticeable. The Revenue Survey villages averaged only 0·34 of a square mile and the fields 0·37 of an acre. These factors will have to be considered in estimates for future work in the District as they tend to considerably raise the cost of both Traverse and Cadastral operations.

23. There were only 10 boundary disputes which were decided without delay by the Settlement Officer.

Out of the 1,958 disputes regarding entries in the records 1,677 were decided during the operations, the balance remaining over for the attestation stage.

24. The demarcation is reported to have been just as bad as last season. The inhabitants attempted obstruction at the commencement of the work, but the Settlement Officer, who was on the spot, stopped this and the work thereafter proceeded quite smoothly.

25. The health of the establishment was fairly good, the average daily outturns accomplished being 12 acres of survey or 36 numbers of record-writing, but these cannnot be taken as fair averages for computing future estimates as progress was retarded by the presence of water and by the scattered nature of the work.

26. All the work of every description has been completed and the records despatched to the Settlement Officer.

Part II.—Reports on Surveys and Records of Rights in Private Estates.

MAJOR SETTLEMENTS.

Bhagalpore District.

Traverse Survey.

27. The traverse camp of No. 4 Party under Mr. P. L. Causley was employed on the completion of the "diara" tract of the Kosi River lying to the North of last season's operations and also in the uplands of the Thanas in the Southern half of the District.

28. The total outturn of 1,380 square miles consists of 1,250 square miles traversed in fully detail for subsequent cadastral survey and 130 square miles for topographical survey on the 4 inch = 1 mile scale.

29. There are 26,424 theodolite stations in the whole area which have been marked by 3,882 stones, 20,892 cylinders and 1,650 pegs.

30. Four Great Trigonometrical Stations have been connected with and the angular work checked by the observation of 110 Azimuths. The mean variation of the magnetic needle is 10°36′ East.

31. The demarcation in the uplands was good. In the "diara" tract, demarcation was not required except for the Government Estates, where the demarcation was found to be so bad that a certain amount of extra traversing had to be undertaken.

32. The health of the establishment was on the whole good except in the "diara' where Malarial fever was very prevalent.

Cadastral Survey.

33. The 24 square miles cadastrally surveyed and *khanapuried* in the District were dealt with by the Cadastral camp under Mr. C. S. Kraal.

34. The survey was checked by 56 linear miles of "partal" which gives an incidence of 2·4 linear miles of check survey to each square mile of detail.

35. The entries against 2,905 plots have been checked by the Survey staff, which gives an average of 42 per cent.

36. Out of 8 boundary and 507 interior disputes, 7 boundary and 453 interior disputes have been decided.

Topographical Survey.

37. The topographical survey of the Kosi "diara" tracts was undertaken by Mr. Kraal's camp.

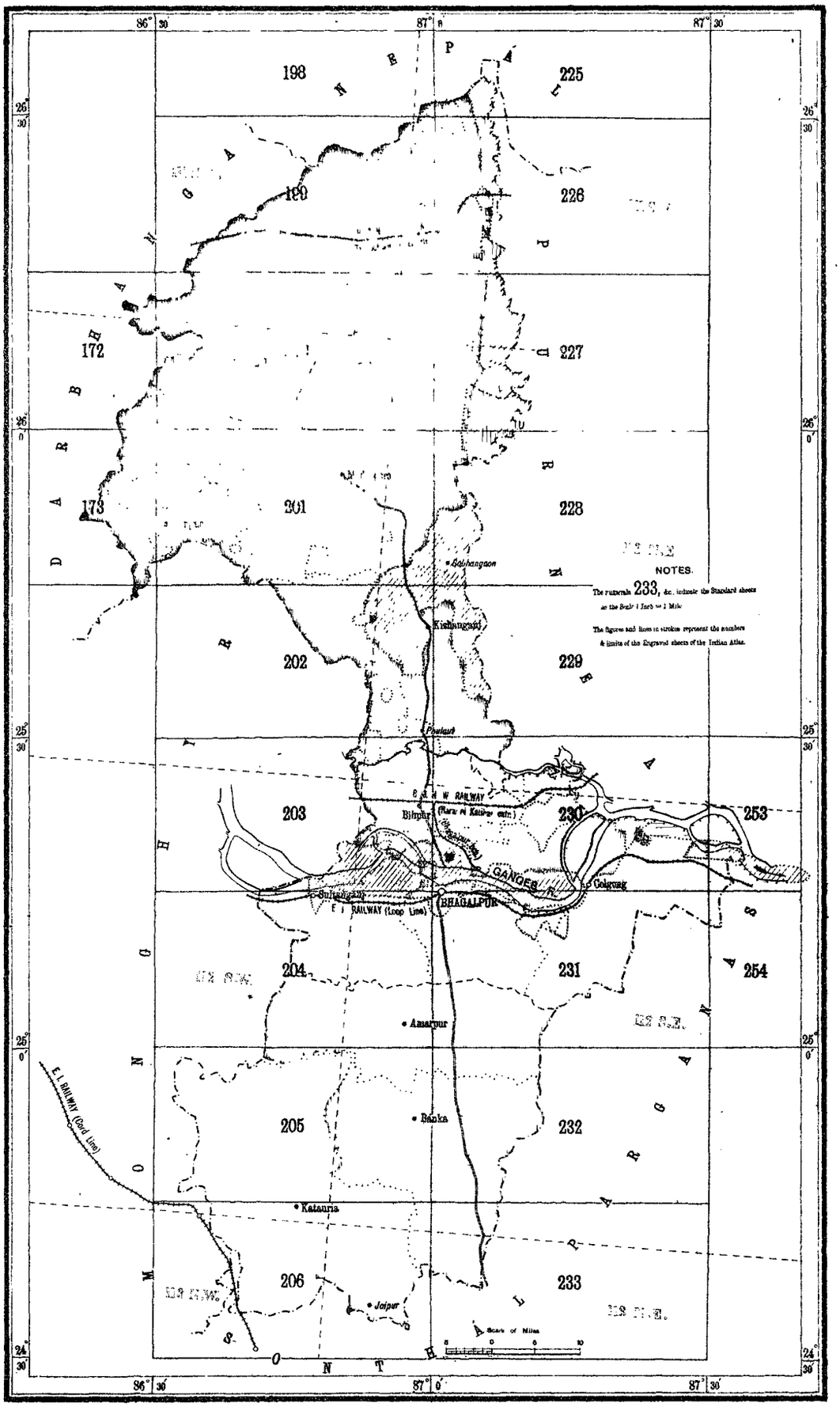
38. The area accomplished, on the scale of 4 inches to the mile, is 123 square miles. The procedure followed is described in para. 15 of last years report.

39. The plane table sections were constantly checked while the work was in progress by the Survey Officers and Inspectors and in addition 74 linear miles of test survey were run.

BENGAL SURVEY.

INDEX TO THE TRAVERSE & CADASTRAL SURVEYS IN DISTRICT BHAGALPUR.

1904-05. No. 4 PARTY.



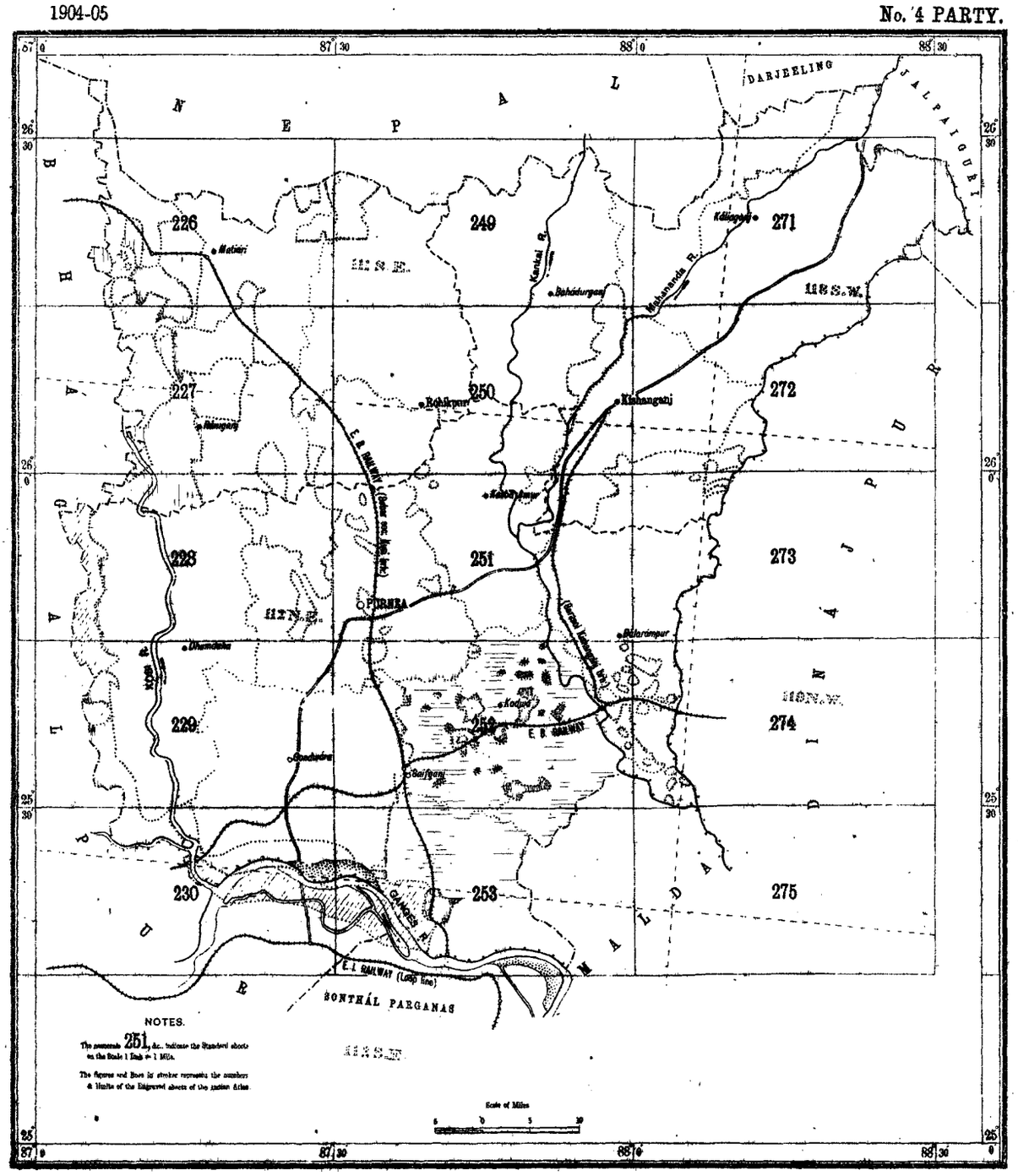
REFERENCES.

- Cadastrally surveyed with records during previous Seasons
- Topographically surveyed on 4-inch Scale during previous Seasons
- Cadastrally surveyed with records during Season 1904-05
- Traversed and cadastrally surveyed with records during Season 1904-05
- Traversed and topographically surveyed on 4-inch Scale during Season 1904-05
- Traversed in advance during Season 1904-05
- District Boundary
- Sub-Division do.
- Thana..... do.

BENGAL SURVEY.

INDEX TO THE TRAVERSE & CADASTRAL SURVEYS IN DISTRICT PURNEA.

1904-05 No. 4 PARTY.



REFERENCES.

- Cadastrally surveyed with records during previous Seasons
- Topographically surveyed on 4-inch scale during previous Seasons
- Cadastrally surveyed with records during Season 1904-05
- Traversed & cadastrally surveyed with records during Season 1904-05
- Traversed and topographically surveyed on 4 inch scale during Season 1904-06
- Traversed in advance during Season 1904-05
- District Boundary
- Sub Division do.
- Thana do.

(H.S., B.D.)—Nov '05—525 Photo. S. I. O., Calcutta.

Purnea District.

Traverse Survey.

40. The total area traversed is 702 square miles of which 468 is uplands, traversed in full detail for Cadastral survey and the balance of 234 is "diara," traversed for topographical survey.

41. These are 13,817 traverse stations which have been marked by 1,513 stones, 9,452 cylinders and 2,852 pegs.

42. The angular work was checked by 61 azimuths and the mean magnetic variation is 2° 4′ East. The demarcation was good in the uplands but bad in the "diara."

Cadastral Survey.

43. Both the Cadastral camps under Messrs. Kraal and Skilling were employed in this District. The area accomplished in both survey and record writing is 1,748 square miles.

44. The average size of the field is 0·75 of an acre. The average of check survey is 5 linear miles to each square mile of detail. The entries against 421,380 plot were checked by the survey staff which gives an average of 27 per cent.

Out of 771 boundary and 70,308 interior disputes, 736 boundary and 61,838 interior have been decided.

45. The demarcation of village boundaries was fairly good. The health of the establishment was fair except in the Kishengunge sub-division where, as was expected, there was a great deal of sickness. During recess there was an outbreak of Cholera and 7 deaths occurred. All the maps and records are complete.

Topographical Survey.

46. The topographical survey of 129 square miles of the Kosi "diara" was carried out along with that of the Bhagalpore District in the same manner. In addition to the usual testing of the plane table sections in the field, 113 linear miles of test survey were run.

District Backergunge.

Traverse Survey.

47. The Tushkali estate in Thana Matbari was omitted in the Traverse Survey of 1903-04, because the settlement Department reported that it had been previously surveyed, but it was found during the course of the Cadastral operations that this was not the case and the work has been undertaken during the year under report.

The area traversed of 27 square miles contains 708 traverse stations which have been marked by 43 stones and 665 pegs.

Cadastral Survey.

48. The cadastral survey operations covered the thanas on the Western side of the District and included a tract lately brought under cultivation in the Sundarbans.

49. The area cadastrally surveyed is 1168 square miles, of which the record writing of 943 square miles has been completed as well as the record writing of 7 square miles left over from last season.

50. Owing to the early setting in of the high tides, it was found impossible to complete the whole of the record writing and consequently the record writing of 16 villages in 225 square miles, as also the detail survey of portions if 9 villages in an area if 26 square miles, remain over for next season. As this remaining tract contains only 74,000 fields the record writing should easily be completed early in the season.

51. The average size if the plot in the Western Thanas is 0·6 of an acre and in the Sundarbans portion 1·6 acres.

52. The native Establishment consisted of 49 Bengali, 7 upcountry Inspector and 897 Bengali Amins, 29 upcountry Amins.

53. To each square mile an average of 4·15 linear miles of test survey has been applied and the entries against 152523 plots have been checked by the survey staff, which gives an average of 22 per cent.

54. There were 131 boundary disputes, all of which were decided by the settlement Department, but 10 had to be returned as it was found impossible to give effect to the decisions.

55. There were 16743 disputes relating to entries in the records. The settlement staff could not cope with the settling of these disputes without the aid of the Inspectors and Amins and at the close of the season it was found that a very large number had not been touched. In many cases Amins had to be detained in their villages for a fortnight or three weeks after completion of their work, waiting till the settlement Kanungoes passed orders on these disputes.

56. The records and statistics of 904 villages have been completed and handed over to the settlement Department. The balance of records of 71 villages which are in an incomplete state have been made over to Babu Nilmoni Chatterji to complete at Barisol.

57. The health of the establishment during the field season was fairly good except for an outbreak of Cholera early in the season which accounted for 25 deaths. During recess, fever and dysentry were very prevalent.

Sundarbans.

Traverse Survey.

58. The programe, which has been fully carried out, comprised the traverse of 251 square miles of cultivation and 320 square miles of dense forest and jungle, including also the Haringhata River.

59. The usual procedure for marking of traverse stations had to be departed from in this area, as, owing to the soft nature of the soil, stones would have sunk and disappeared in a short time. Consequently the trijunction points have been marked by 145 galvanized iron cylinders and 20 trunks of trees, cut off at the right height. Salient points on the boundaries and intermediate stations have been marked with 11 gavanized iron cylinders, and 397 trunks of trees. At the remaining 5,671 stations, wooden pegs. 3 feet long and 4 inches in diameter have been driven into the ground.

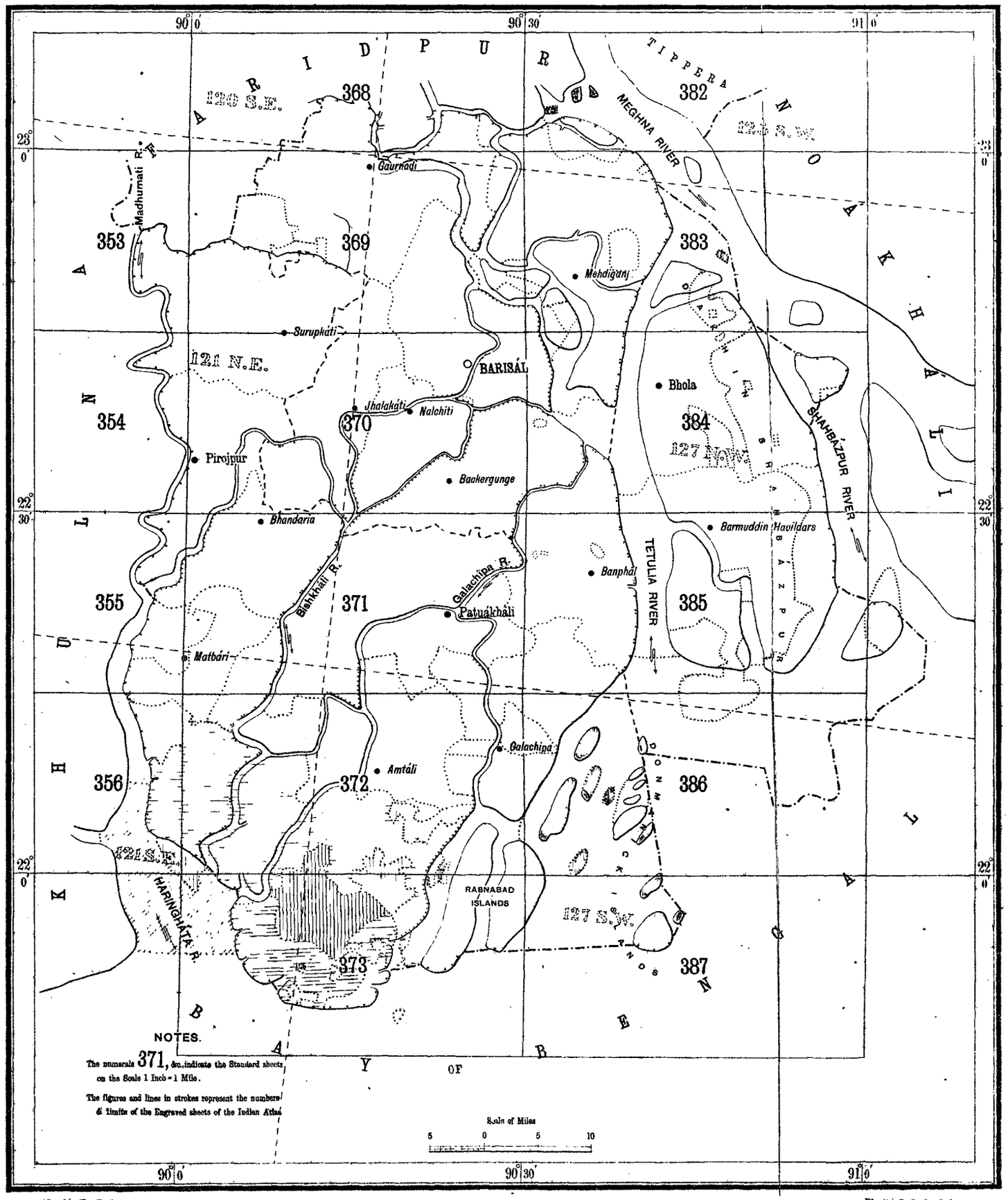
60. In addition to these marks, at all stations in the forest and jungle area, cross sticks painted white, were affixed to an adjoining tree, or else a white cross was painted on an adjoining tree. These marks helped very materially in the identification of stations at the topographical stage.

61. The mean of the azimuths observed in this tract gives a magnetic variation of 1°02′ East.

62. The density of the forest and jungle debarred any attempt at systematic line clearing along the edges of the tidal creeks or "khals" and a system of zig-zag traversing, *i. e.*, placing successive stations on opposite banks of the "khals" and measuring the distances across the water by means of subtense bar observations was adopted. This system proved a complete success and the traverse work is very good.

63. There have been very great difficulties to contend with in this survey. The establishment had to live and sleep in country boats and carry fresh water and food supplies. As absolutely nothing is obtainable locally, all supplies had to be sent out at regular intervals from the northern area. The want of fresh water caused a good deal of sickness, especially skin diseases and sores, from which fully 75 per cent of the establishment suffered and presented a ghastly appearance at the end of the field season. Malarial fever and dysentry were very common and lastly there was considerable danger owing to the country being infested with tigers. Two "khalasis" were killed by tigers during the season. The body of one of these men was recovered owing to the pluckiness of the surveyor in charge of the

1904-05. **DISTRICT BACKERGUNGE** No. 6 PARTY.



No 334 E., B. D. O.—Nov. 05—5[illegible]

Photo. S. I. O., Calcutta.

REFERENCES.

Surveyed with records in previous Seasons
Do. do. in 1904-05
Do. in 1903-04, records only in 1904-05
Do. by Settlement Dept. in previous Years
Traversed & surveyed without records in Season 1904-05
Traversed in Season 1904-05
Traversed & surveyed on 4-inch scale with records in 1904-05
Traversed & surveyed on 4-inch scale without records in 1904-05
Traversed & surveyed on 2-inch scale in 1904-05
District Boundary
Sub-Division do.
Thana do.

BENGAL.

INDEX MAP OF DISTRICT FARIDPUR.

1904-05. No. 6 PARTY.

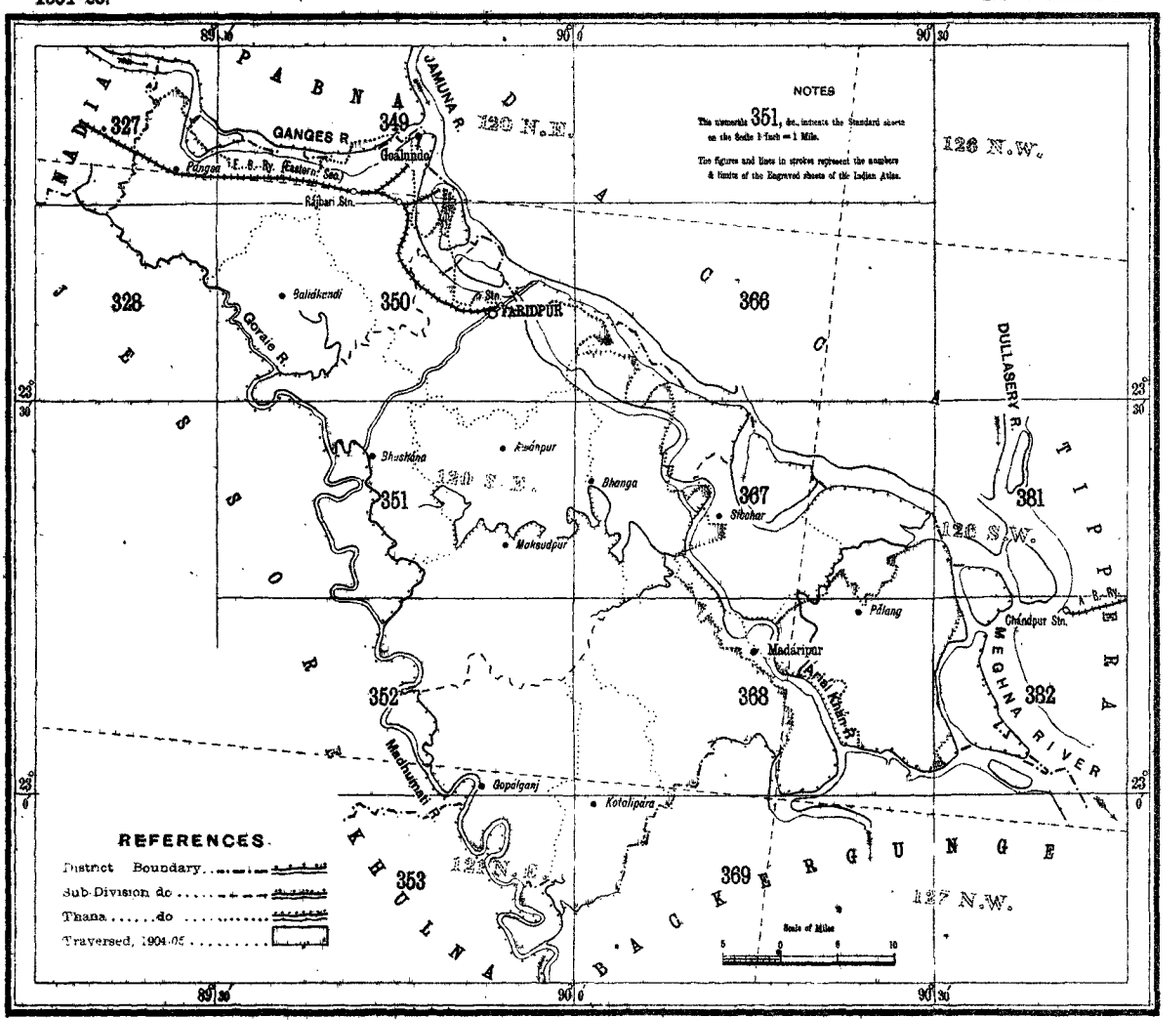


Photo. S. I. O., Calcutta.

squad who struck the tiger over the head with his brass sight rule causing him to drop the body. Under all these unfavourable conditions it is not to be wondered at that establishments absconded wholesale and considerable difficulty was experenced is replacing them.

Topographical Survey.

64. The area topographically surveyed, consists of 227 square miles on the 4 inch scale of dense forests and jungle and also 93 square miles of the Haringhata River which have been surveyed on the 2 inch scale. The survey has been checked by the resurvey of numerous blocks and by 119 linear miles of "partal." The impenetrable jungle made progress slow, as it confined line clearing to the low outturn of 20 to 25 chains a day.

65. This tract is contained in 8 Revenue Survey villages and has been mapped on 25 sheets excluding the 2 sheets on the 2 inch scale of the Haringhata River.

66. Any scattered cultivation, which was encountered, has also been surveyed on the 16 inch scale and a record has been prepared for 8 of these villages. The high winds and tides and frequent storms which occurred late in the season near the Bay of Bengal made it dangerous for the survey squads to remain longer in boats and the establishment had consequently to be withdrawn before the whole record could be completed.

66. Traces of the whole area have been made over to the Settlement Officer.

67. The Settlement Officer requested that chars Bogola and Hare, which had been reported to have reformed, should be surveyed. Char Bagola which lies in the Bay of Bengal to the South of the Rabnabad islands was traversed and connected to the traverses on the main land, but no trace of char Hare was visible even at ebb tide. The area of char Bagola is 77 acres and on the edge of the char are the remains of the wreck of a large vessel.

DISTRICT FARIDPUR.

Traverse Survey.

68. The survey of this District was ordered in Government Notification No. 2151 T. R., dated 19th September 1904. The area traversed, which comprises nearly all the lands of the District which are not "diara," is 1893 square miles.

68. Connections have been made to 12 stations of the Great Trigonometrical survey and the results of the azimuths observed gives a mean variation of the magnetic needle of 1°26′ East.

69. There were 44,459 Theodolite stations which have been marked by 6,318 stones, 880 galvanized iron cylinders and 37,261 pegs. The galvanized iron cylinders were embedded at the intermediate stations of the circuit bounding the Ganges River so as to leave a line of permanent marks along the limits of the "diara" tract.

70. There was no demarcation whatsover of the village boundaries and as the survey officers, although gazetted as Assistant Superintendents under the Survey Act had no powers delegated to them to enable them to enforce demarcation or to summon defaulters for non-attendance, the result was, considerable delays in progress and large differences in the boundaries of villages when compared with the maps of the old Revenue Survey.

71. The attitude of the inhabitants was apathetic and no help whatsoever was afforded. The removal of traverse marks was a source of considerable trouble and necessitated the intervention of the police with a warning from the Collector. Such removal of marks is only to be expected in tracts where no demarcation has been undertaken and no assistance in pointing out village boundaries is obtainable, because the traverse surveyor is bound under these circumstances to make many mistakes and when the inhabitants afterwards discover marks not on their boundaries, they naturally remove them.

72. The country to the South and East is low lying and intersected with "khals." In thanas Madaripur, Kotalipara and Gopalgunj there are

extensive swamps or "bhils;" the Ramshil bhil being found most troublesome to traverse. To the North and West the District consists of uplands, Thana Bhusana being thickly wooded and consequently delaying the line clearing very considerably.

73. The health of the establishment was fairly good, but there were numerous slight cases of fever and dysentry. The plots and computations have been completed in every respect and the section will take the field without any arrears.

DISTRICT RANCHI.

Traverse Survey.

74. The traverse camp of No. 5 Party under Mr. T. W. Babonan traversed, during the year under report, an area of 1632 square miles in Thanas Kochdega Kurdeg, Palkot, Basia and Gumla.

75. The angular work was checked by 308 azimuths which give a mean magnetic variation of 1° 13' East. The seasons work has been connected to 6 Great Trigonometrical stations.

76. Three-fourths of the area dealt with during the season is hilly and broken country and the subtense bar had therefore, to be constantly used.

77. There were 30,350 theodolite stations which were marked as follows: 969 trijunction points by stones with a dot in centre, 18,808 local stones marked by a broad arrow cut thereon, 5256 broad arrow marks cut on rocks "in situ" and 5317 pegs.

78. The demarcation was, as usual, found wanting and the surveyors, had to survey villages as pointed out. There are no Revenue Survey or other old maps in existence which show village boundaries and the Deputy Commissioner's list of villages referred to in para. 21 of my last report was found most useful.

79. The health of the establishment was, owing to the unhealthy nature of the tract, indifferent All the computations have been completed in every respect.

Cadastral Survey.

80. The cadastral survey was undertaken by camp 2 of No. 5 Party under Mr. H. W. Biggie.

81. The outturn of the season was 909 square mile of Cadastral survey and 1040 square miles of record writing. This outturn brings all arrears of work up to date and the total area "*Khanapuried*" in this District is now coincident with that surveyed.

82. The survey has been tested by 2954 linear miles of test survey which gives an incidence of 3·25 linear miles of test survey to each square mile of detail. The record writing was tested by the checking of 76,306 entries by the survey staff which gives an average of 15%. This average, which is lower than usual, is due to sickness amongst the supervising staff and to difficulties of communication owing to the nature of the country.

83. There were 378 boundary and 10831 interior disputes of which 377 and 10679 respectively were settled during the course of the operations.

84. The demarcation, as in previous seasons, was indifferent. The health of the establishment was bad. One Hospital Assistant was employed throughout the season visiting the sick in the field and another Hospital Assistant was in charge of the hospital at the head quarters of the camp.

85. The average daily outturn of the amins was only 16 acres of survey or 23 numbers of Khanapuri. This is a poor outturn and necessitates keeping up a large establishment and consequently poor earnings to the indifferent amins. No doubt the establishment will improve with more experience, but it has not improved as much as was hoped for last year.

86. All the records have been completed, and, with the usual reproductions of the maps have been handed over to the Settlement Department.

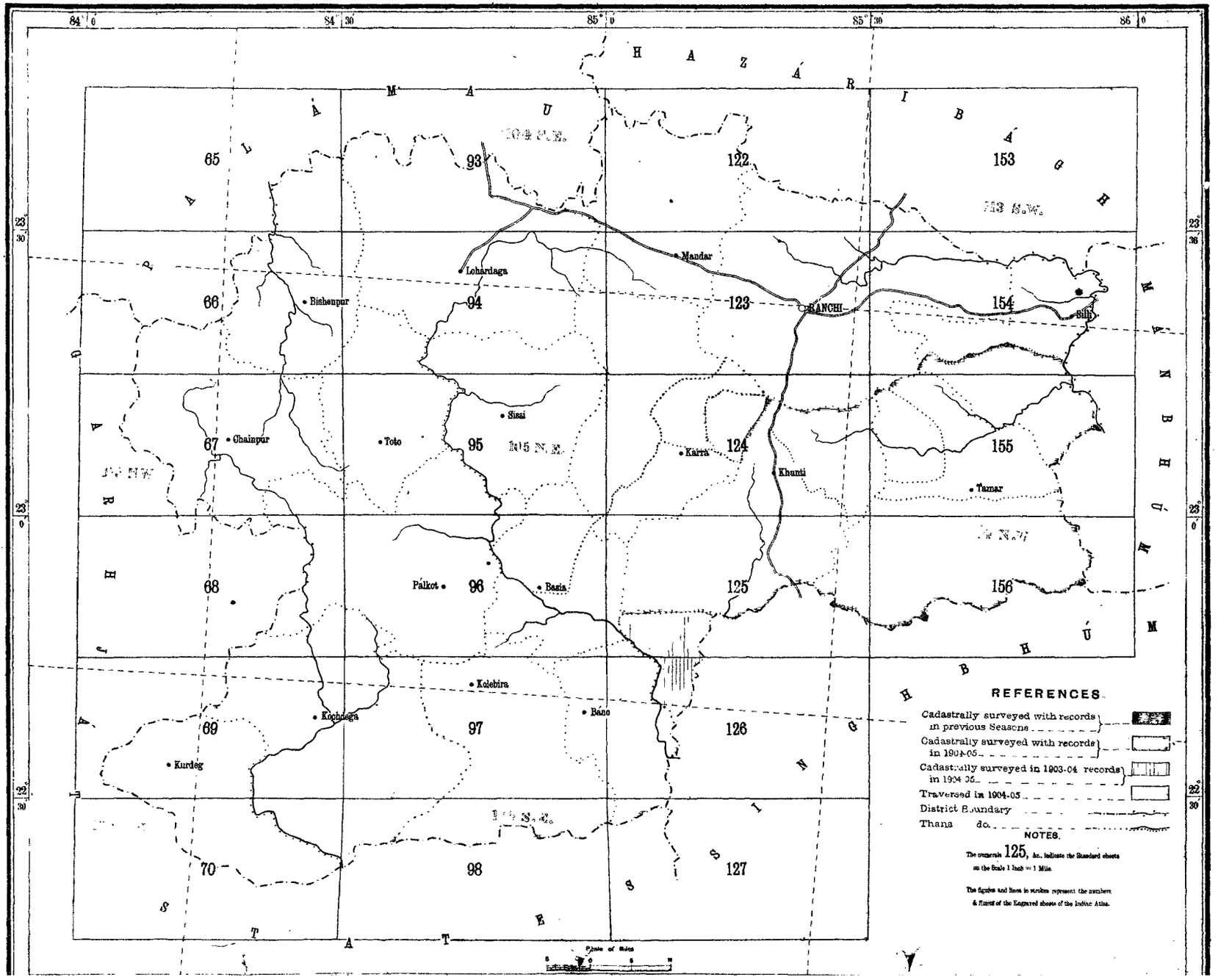
DISTRICT SINGBHUM.

Cadastral Survey.

87. In para. 23 of last years report the area traversed of the Seraikela and Kharsawan estates was reported to be 600 square miles. The true area

BENGAL SURVEY.

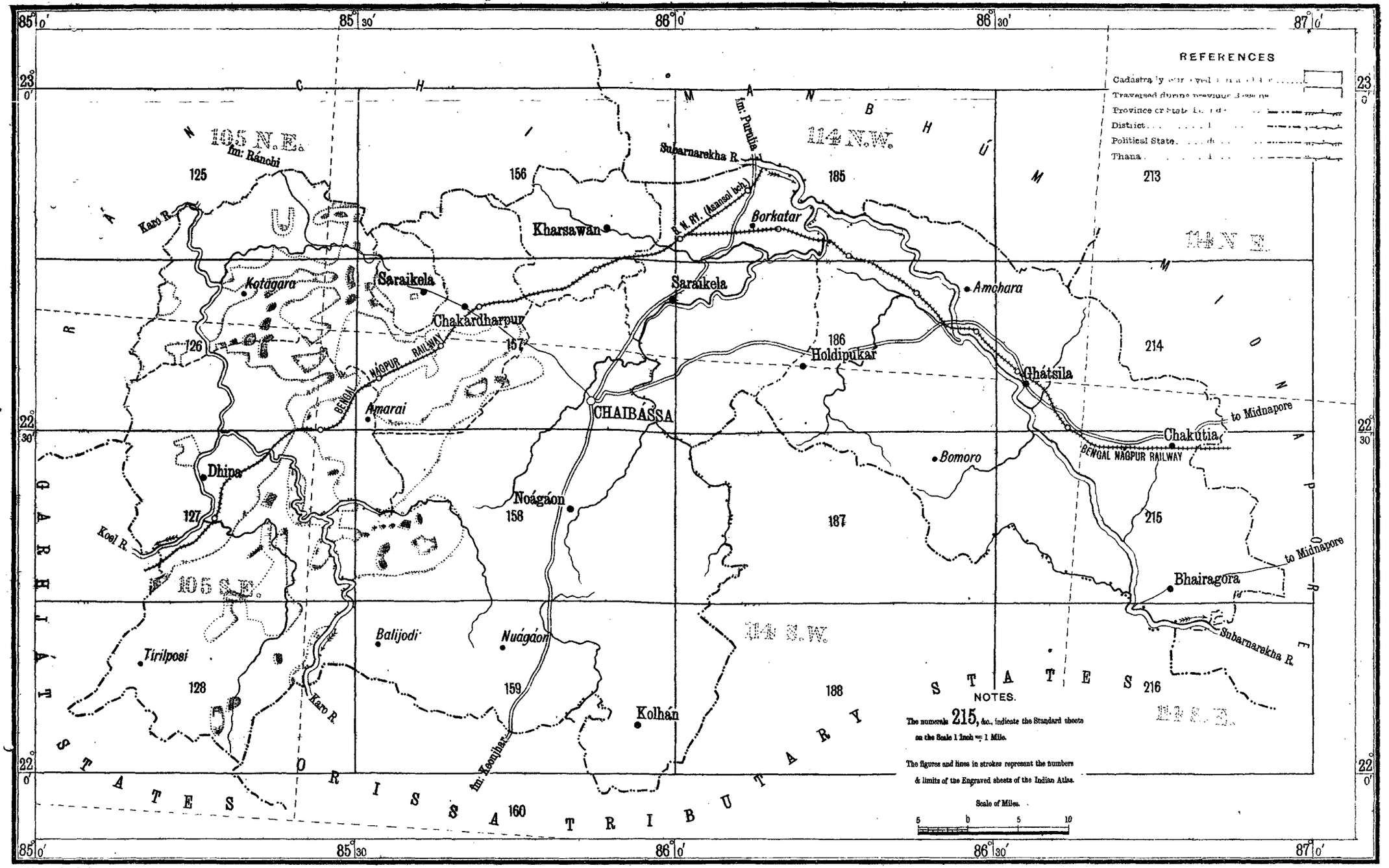
1904-05 — **INDEX TO THE TRAVERSE & CADASTRAL SURVEYS IN DISTRICT RÁNCHI.** — No. 5 PARTY.



BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT SINGHBHUM.

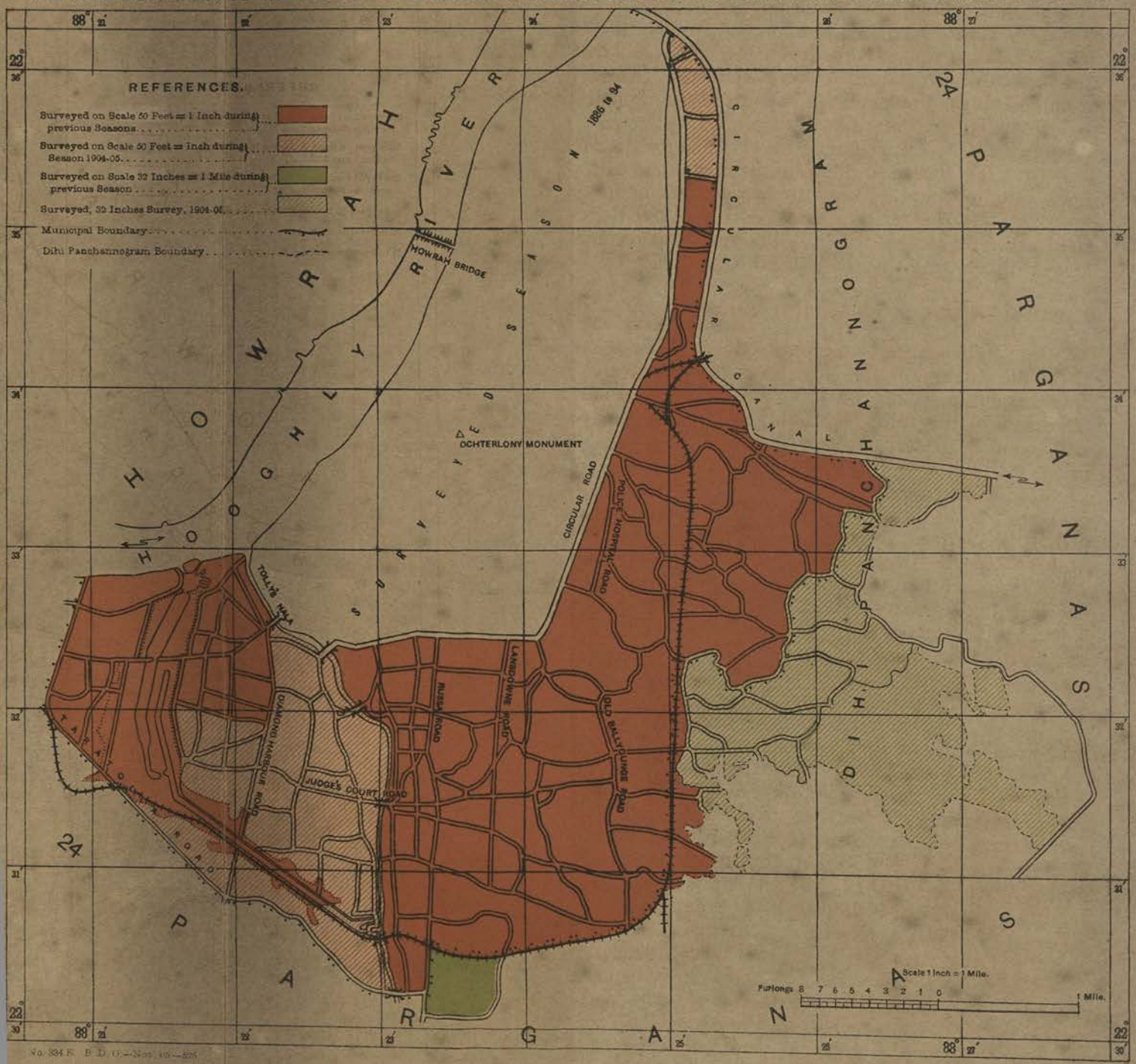
1904-05. No. 5 PARTY.



No 324 E. B. D. O.—Nov. 05—525

Photo. S. I. O., Calcutta.

INDEX TO THE SURVEY
OF
THE ADDED AREA TO THE TOWN OF CALCUTTA AND PORTION OF DIHI PANCHANNOGRAM 1904-05.



No. 334 S. B. D. O.—Nov. 05—825

Photo. S. L. O. Calcutta

cadastrally surveyed during the year under report proves to be 594 square miles. This does not mean that any unnecessary traversing was done last season, but is merely the difference that may be expected on account of offsets from the traverse lines.

88. This work was allotted to camp 3 (Mr. C. S. Gasper in charge) of No. 5 Party. The whole programme of field work was completed in both survey, and record writing. The survey has been checked by 2043 linear miles of test survey which gives an incidence of 3·4 linear miles of check to each square mile of detail. In the records 70,855 entries were checked by the survey staff which gives an average of 21%.

89. There were 281 boundary disputes and 4103 interior disputes of which 277 and 2564 respectively have been decided, the balance remain over for the attestation stage. The attendance afforded by the "raiyats" was excellent throughout and all labour was supplied free of charge.

90. The average size of the plot is 1·14 acres. This large average is due to one-fourth of the tract under survey being either waste or jungle clad land.

91. The health of the establishment was bad. Fever was very prevalent in the jungle tract, and was the main cause of the sickness experienced.

92. The records, &c., have been completed in every respect and despatched to the settlement office. The few maps remaining for reproduction will be sent direct from the Bengal Drawing Office.

PART III.—REPORTS ON MISCELLANEOUS SURVEYS.—CALCUTTA SUBURBS SURVEY.

93. This survey was continued by the detachment under Mr. R. B. Smart.

The outturn of the year consists of (*a*) traverse of 2090 acres of Dihi Panchanagram, lying outside the municipal boundary, on the scale of 32 inches to the mile, (*b*) Detail survey of the foregoing area on 32 inch scale, and (*c*) Detail survey of 1430 acres on the scale of 50 feet to the inch.

94. The traverse work proved troublesome, owing to the difficulty in demarcating the limits of the several Sub-Divisions. The old maps were utilised as a guide but where the boundaries ran through fields they proved useless and the traverses had to be run only approximately to their proper positions leaving it to be decided, after demarcation, how the plots were to projected.

95. The area of 2090 acres surveyed on the 32 inch scale has not been completed in demarcation, owing to the difficulty in ascertaining the names and obtaining the attendance of tenure holders. There are also a number of detached holdings which remain to be mapped and connected by traverse.

96. The 1430 acres of large scale survey consist of 1181 acres within Municipal limits and 249 acres outside.

97. The total area, in, what is known as the added area of Calcutta, completed to date is 8513 acres, of which 6600 acres comprise Municipal and Revenue holdings belonging to Dihi Panchanagram and Belliaghatta Canal surplus lands and the balance of 1913 acres comprise municipal holdings with scattered holdings in the Government estates of Addy Ganga Jheel, Daripin and Sahiban Bagicha.

98. Outside the added area of Calcutta, 249 acres, being portions of Sub-Divisions of Dihi Panchanagram, of which the remaining portions lie within the added area, have also been surveyed on the large scale.

99. As already stated 2090 acres have been surveyed on the 32 inch scale and therefore, as far as actual survey work is concerned, there is little left for the detachment, except some scattered holdings and the connection by traverse of the scattered blocks of Panchanagram, but there is a considerable amount of difficult work remaining in the way of ascertaining the limits and showing the boundaries of Municipal and Revenue holdings on the maps.

100. Owing to tenure holders having bought and sold holdings without any reference to the Collector, the registers are in a most incomplete state and it often takes months to discover who is the owner of a plot. It has been found that there are several plots of land without Municipal numbers and several revenue holdings have been demarcated for which no taxes have been paid.

101. In addition to the amount of work already detailed, 45 acres already surveyed in the previous survey of 1887 to 1894 had to be resurveyed owing to municipal holdings, forming a part of the added area, having been found to lie in these 45 acres. The changes since the former survey were so great that the correction work amounted to a new survey. Also 26 acres to the North of Calcutta had to be revised on the old maps in order to demarcate the boundaries properly.

102. The area extraction of all the work within the added area is up to date, but the exterior tracts cannot be dealt with until all the holdings have been demarcated. The completion of areas is a troublesome operation owing to the necessity of making the areas of the several Revenue holdings, contained within one Municipal holding, tally with the area of the latter.

103. Several registers are under compilation, but can of course only be completed as the demarcation proceeds.

104. Out of 393 maps, 133 have been fair drawn in skeleton, *i.e.*, all details are shown, but the boundaries of holdings can only be entered as attestation progresses.

Attestation has commenced, four Sub-Divisions having been made over to the Collector.

105. Up to date there have been 2283 disputes recorded for enquiry out of which 1305 have been decided.

Malda District.

106. The traverse and detail survey of a portion of a "char" in the Ganges River near Mauza Taraf Gora Pakhia was ordered by the Board. At the commencement of operations the Collector refused to demarcate the tract and it was not until the matter was reported to the Commissioner that this was done. The total area traversed and cadastrally surveyed is 4·5 square miles.

107. With a view to locating the tract with reference to the former Revenue Survey, a traverse of the surrounding country had to be undertaken. Owing to the entire tract having greatly altered, no common points were forthcoming and the traversing had therefore to be continually extended, until, at the close of the season, 53 square miles had been traversed and even then, not sufficient points are available for the purpose in view. These 53 square miles, comprise 29 square miles in the Murshidabad District which may give the points required, but as the Revenue Survey volumes have not been received up to date, it is impossible to state definitely.

Patna District.

108. At the request of the Collector of Patna two villages, named Sadikpur urf Kanhaipur and Sarhan, have been traversed. The area was 6 square miles and the plots are ready for the cadastral survey next season.

Patna Division diara survey.

109. With a view to the annual checking of accretions and diluvion in "diara" tracts, the Board ordered that the present position of the Ganges River in the Patna Division, be marked on maps, showing the position of the river according to the latest available surveys.

110. The procedure adopted was to run a traverse along each bank of the river as close to the waters edge as feasible, connecting these lines with trijunction of the former survey, and to map the actual waters edge by means of offsets. A set of maps on the 16 inch scale were compiled in the Bengal Drawing Office showing the course of the river as previously surveyed in block and on these maps the present position of the river has been shown in red. The total length of the survey was 354 miles and the approximate area enclosed was 55 square miles.

111. The change in the course of the River, in most places is very great and an inspection of the map, points to its being very doubtful. whether the existing permanently marked lines along the edges of the "diara" can be drawn closer together with safety. Unless these two lines can be drawn

together with a fair chance of a considerable proportion of the marks remaining after a rainy season, or unless marks placed at selected points within the tract, can be counted on to remain for some time, it is evident that the proposed annual revision cannot be undertaken by a non-professional agency and the cost of a yearly revision entailing a theodolite survey would be prohibitive. It is therefore proposed to select, after a careful examination of the map lately prepared, points and embed marks of a fairly permanent nature at them. If a fair percentage of these marks are forthcoming after the next rainy season, the difficulty will have been solved, and there is no reason, why, with the aid of these fixed points, a yearly revision should not be carried out by inexpensive methods.

Ranchi District.

112. The cadastral survey of mauza Chorea has been completed and the record writing finished under the supervision of a Deputy Collector, deputed for this work by the Deputy Commissioner.

Udaipur State.

113. In para 33 of last years report it was stated that about 150 linear miles of the boundary of the State still remained to complete. During the year under report, 49 miles have been traversed and 35 sheets have now been plotted on the 4 inch scale. The work remaining to be done comprises the traverse of 44 miles on the Bilaspur District boundary, the demarcation and plotting of the boundary according to the one inch survey of 1865 and the transfer to the 4 inch plots, of the boundary of the remainder of the State from the Boundary Commissioners maps.

Relaying of Jalpaiguri-Cooch Behar boundary.

114. This work was held over, for several seasons as no officer was available to undertake it, until Mr. O'Donnel was deputed to Bengal Surveys by the Surveyor-General specially for this work.

115. Mr. O'Donnel ran at raverse along the boundary and compared it with former traverses and maps and his report, with maps and data, is being sent to the Deputy Commissionar of Jalpaiguri.

PART IV—REPORT ON THE BENGAL DRAWING OFFICE.

116. The charge of this office was held by Mr. E. F. Berkeley until the 12th May and afterwards by Mr. G. W. Archer until the close of the year under report.

117. In last years report mention was made of the necessity of more accommodation for this office on account of the very great increase of work. This change was carried out during the year and the office is now located in 166 Lower Circular Road in the buildings formerly occupied by St. James School, Before the the new premises could be occupied, considerable alterations, comprising the building of a small house as Photo room for the Vandyke section, erection of racks in the Record room, putting iron gratings into the doors, and windows of same, removal and re-erection of the shed for grainers, laying down water connection for for both filtered and unfiltered water for the photo room and pipes for the surface drainage in the compound, had to be carried out. In order to dislocate work as little as possible, the office was moved in by sections during the months of February to April inclusive, but nevertheless there has, of course, been some reduction in outturn.

118. During the year a large machine press, driven by an electric motor has been purchased and erected and the necessary electric connections carried out. Several minor improvements, such as the glazing in of a verandah for the use of draftsmen on delicate work and the erection of a number of small racks in the mapping section, have also been effected.

119. The new premises, with the improvements noted above, are very suitable for the requirements of the office. but the very rapid increase of

work,. especially in the reproduction section, already points to the necessity of increasing the accommodation of the photo room. However as there is plenty of room available in the compound, the necessary extra building will be seen to during next season.

120. The Bengal Drawing Office, in addition to its proper work of compilation of standard sheets, has gradually undertaken a very heavy, and varied programme and is therefore, in addition to the general section, consisting of the officer in charge and his clerical staff, divided into 5 main sections as follows:—(*a*) Standard mapping section (*b*) Thana mapping section (*c*) Reproduction of village maps section (*d*) Badar section and (*e*) Map record section.

Standard Mapping Section.

121. The Districts of Darbhanga, Monghyr, (north of the Ganges) and Bhagulpur (north of the Ganges,) which had been completed in cadastral survey during previous years, are comprised in 18 standard sheets, of which 4 had been completed and published during 1903-04. As regards the remaining 14 sheets, the following outturn has been accomplished during the year under report: 4 sheets have been completed and submitted for publication, 3 are practically completed and will be submitted for publication, shortly and the remaining 7 sheets are all in hand in different stages of progress. Owing to the issue of recent orders regarding the reduction of the size of standard sheets to half of their former size, two sheets which were not far advanced have been rejected by order of the Deputy Surveyor-General and will be redrawn. Also the two Eastern sections of one sheet have been rejected for the same reasons.

122. The 14 standard sheets of Chittagong, which were reported as completed last year, had to be recalled after publication in order to enter Thana and District boundaries in accordance with the orders of the Deputy Surveyor-General. This work has been completed and the sheets have been returned for press order.

123. The District of Backergunge is contained in 17 standard sheets, of which 13 quarter sections had been projected and plotted when the new orders regarding size of the sheets were received and the work had consequently to be rejected.

124. Under the orders of the Deputy Surveyor-General the compilation of 4 standard sheets of District Tippera was undertaken in the Bengal Drawing Office. Three sheets have been projected and plotted, but further work on these sheets has been temporarily postponed in order to make up for the loss in outturn on the Bihar sheets.

125. The outturn of work of standard mapping in Bengal has not been as good as was expected This is due to (*a*) unavoidable dislocation of work consequent on the removal of the office and (*b*) rejection of some sheets owing to the new order reducing the size of the sheets. Next season, there will be no move and as the new office provides better light and more suitable accomodation than we have been accustomed to heretofore, progress should be much more satisfactory. Moreover the new orders regarding the size of sheets, although they have temporarily checked outturn, will in future, accelerate outturn, as sheets need not be kept back, as at present, waiting for material of large tracts not yet surveyed. Steps have also been taken to accelerate despatch of traverse data and original sheets to the Bengal Drawing Office, but there is no doubt, that in order to enable the Standard mapping section to deal with the large amount of material now available and to keep pace with the present outturn of the field parties, a considerable augmentation of establishment will be necessary.

126. This section also undertook the preparation of District maps on the scale of 4 miles to the inch. During the year the District maps of Saran and Cuttack have been completed, and sent in for publication. The District map of Puri has also been completed and is under submission for publication. The District map of Champaran is well advanced and that of Darbhanga is as far advanced as the publication of the Standard maps permits of. The

map of Chittagong is in hand, but is giving great trouble in the incorporation of old material for the gaps left in the latest survey.

127. A small computing staff attached to this section has been employed throughout the year on computing the co-ordinate values of village trijunction points with a view to the compilation of the traverse charts ordered by the Surveyor General. During the year 2,627, villages of Darbhanga and 11,071 of Orissa have been dealt with and it is hoped that 27 charts will be ready by 1st April 1906, and the remaining 79 charts by 1st October 1906.

128. During the year the compilation of maps of Districts Gaya and Shahabad showing permanently marked trijunction points has been completed. As regards similar maps of the Orissa Districts 7757 village have been completed and it is hoped to complete the trijunction map of Orissa as well as that of Patna before the 1st April 1906.

129. This section has also compiled an index map of District Faridpur and carried out the selection of material of 30 sheets on one inch scale for preparation, of Atlas sheets.

Thana Mapping Section.

130. In last years report one Thana map of Orissa was reported to have been returned to the Collector of Cuttack in order to reconcile discrepancies. This map was received back but was still found to contain discrepancies, and had to be returned. The map has not been recieved back. This is the only Thana remaining to complete the Orissa Division.

131. Of District Champaran; 2 Thana maps have been completed and published during the year, which complete the District.

132. Of District Darbhanga; 6 out of the 10 Thana maps have been completed and published during the year and the remaining 4 are in hand.

133. In District Chittagong there are 13 Thanas of which 11 have been completed and published: 6 during the year under report, and 5 previously. The remaining 2 await receipt of the standard sheets.

134. The Thana maps of District Monghyr, and Bhagalpur cannot be undertaken until the standard sheets are published.

Reproduction of Village Maps Section.

135. The work of this section has increased very rapidly. Altogether during the year under report 17,547 sheets have been traced, 12354 have been examined, 280822 copies have been printed and 239082 copies have been supplied to the Collectors and Settlement Officers. The calls for maps are constant and everything points to the programme of next season being at least double of that just accomplished.

136. In last years report it was stated that only 20 sheets remained of Orissa to complete the programme, but on a recount it was found that there were 64 sheets. These 64 sheets have been traced and examined and 640 copies reproduced and despatched.

137. Instead of 6996 sheets of Saran, as reported last year, it has been found that the programme is 7245 sheet. Of these, 252 sheets have been traced and examined, 31130 copies reproduced and 28110 despatched. To complete the programme there now only remains the reproduction of 29 sheets and the despatch of 14,340 copies which were retained owing to certain discrepancies discovered at the examination stage. The Settlement Officer has explained these discrepancies and it is hoped to complete the programme by December 1905.

138. The total number of sheets of Mozaffarpur is 6376, of these 2,000 were traced last season. During the year 4376 have been traced, 6376 examined and 51550 copies reproduced, of which 32460 copies have been despatched to the Collector. A number of discrepancies were discovered in the Revenue Survey numbers which delayed progress.

139. Good progress has been made with the 5,796 sheets of Champaran, the whole of the sheets having been traced and examined and 24,590 copies reproduced, of which 4,960 have been despatched. These sheets have not the Revenue Survey numbers entered on them but as the Director of Land Records

has lately agreed that these are not absolutely necessary the balance in hand will be despatched without further delay.

140. Good progress has also been made with District Durbhanga which shows a programme of 9167 sheets. Of these, 7,061 sheets have been traced and 1,156 examined. The reproduction work will start in October 1905.

141. In last years report it was stated that 220 sheets of Kalimpong had been traced and examined. These sheets have now been reproduced and 2,200 copies supplied.

142. During the year 1,007 sheets of Backergunge have been traced, 844 examined, 1080 reproduced and 165,082 copies despatched to the Collector. Taking the two seasons together, the programme was 1,796 sheets, all of which have been traced, 1,633 examined and 1577 reproduced. Progress was unavoidably interfered with owing to the receipt of orders from the Settlement Officer not to reproduce villages until lists showing which had undergone final examination by the Settlement Department were received. In several cases the villages on a list were completed before the next list was received.

143. In last years report 1556 sheets of the out-turn of the field parties in season 1903-04 were shown as remaining for reproduction for attestation purposes. These 1556 sheets, plus 418 sheets, sent in subsequent to the submission of my report, have all been reproduced and despatched. The outturn of the field parties during the season under report gives 7503 sheets, of which 5,950 sheets have been reproduced and the balance will be completed and despatched by middle of October.

144. Owing to this large number of sheets being received during August and September and the necessity of supplying copies before commencement of next season, the establishment had to work overtime on contract. In future, it is hoped that it will be possible to supply the sheets earlier and in smaller batches.

145. There has been some improvement in the reproduced copies, but not as much as was hoped for last season. It has been found necessary to maintain a small establishment to touch up the portions of the copies which reproduce faintly, but as orders have been issued that the original sheets are to be touched up at the same time as the copies for attestation purposes, these defects should be obviated when the sheets are finally reproduced.

146. In connection with this section it has been found necessary to maintain a small "badar" establishment, varying from 3 to 8 draftsmen, to deal with "badars" in the original sheets which became apparent during the examination of the traces. All such "badars" are referred to the Settlement Department and the sheets corrected in accordance with the orders received.

The Badar Section.

147. During the year "badars" of 84 villages of Bihar have been received. These, together with the 3 villages remaining over from last season, have been completed.

147. Badars relating to 63 villages of Backergunge were received, of which 51 have been corrected and returned.

148. The headings of 15,165 sheets and the adjoining village names on 17,944 sheets of Bihar have been corrected in accordance with the spelling of the Thana lists. Districts Mozafferpur and Saran have been completed in this respect. District Champaran is practically completed and Districts Darbhunga and Monghyr are in hand.

149. The correction of village names and entering of Thana numbers, in accordance with Thana lists and maps, has been carried out of 6,783 villages in the traverse volumes and of 5756 villages in the traverse field books of Districts Mozaffarpur, Saran and Champaran.

150. Thana lists of 9383 villages of Mozaffarpur and Saran have been compiled and the column showing Main, Sub-circuit and village numbers filled up for 6177 villages.

151. In the Thana lists of Orissa the column showing areas. Main circuit numbers, &c., have been filled up for 12,996 villages and the correction of

village names has been carried out on 35 village maps and 1517 villages in the traverse field books.

152. In para. 41 of last years report reference was made to the correction of the sheets of the Jaipur estate in District Bogra with a view to their reproduction. During the year under report 24 sheets were corrected with great difficulty and the Director of Land Records having agreed that the most satisfactory method would be to have the numerous necessary corrections attended to on the ground, all the original sheets and paper traces have been returned to the Manager and their reproduction will be started on their receipt in the Bengal Drawing Office.

153. The Collector of Puri having reported that there were discrepancies between the settlement traces and the reproduced copies of maps supplied to him, the settlement traces were called for and a start made in the correction of the paper traces. Up to date 201 villages on 237 traces have been corrected but this work has been stopped by my order, pending receipt of the reproduced copies, as it is doubtful whether the correction of the copies would not be cheaper and quicker.

154. The following miscellaneous work has also been accomplished by this section. Comparison of the settlement areas of 1613 villages of Mozaffarpur with the Universal Theorem areas and report of all discrepancies to the Settlement Officer and the entry of Thana numbers on 1261 original sheets of Chittagong.

Map Record Section.

155. This section has received during the year 3081 original maps from the field parties and 1357 from the Map Record and Issue Office. The total number of original maps now lodged in this office is 81,592.

156. The removal of the large racks and all these sheets to the new office has been a task of considerable difficulty but the opportunity has been taken to re-arrange all the maps "Thanawar." Up to the close of the year under report 55,357 sheets have been finally arranged and racked and "Thanawar" lists made out for the same. The Thana serial numbers have been pasted on to the backs of 13,435 sheets. All the sheets should be finally racked and the registers completed for same in the course of a few months.

157. The paper traces which are prepared prior to the reproduction by the Yandyke process are also kept in this section. These are all being methodically stacked and a register is under preparation of same so that they will be easily accessible in case any more copies of maps already reproduced are required.

CHAPTER III.

PART I.—TOURS OF SUPERINTENDENT, PROVINCIAL SURVEYS.

158. I have been in the field and on tour for 168 days. Owing to heavy office work, incidental with the rapid increase of the Bengal Surveys I have not been able to give the same amount of personal inspection as in former years to the several sections in the field, but I have visited each party several times during the field season and inspected Nos. 4 and 6 parties with all their camps during recess and also the Bengal Drawing Office and Calcutta Suburbs Survey.

PART II.—SERVICES OF OFFICERS.

159. Among the Executive Officers, Captain F. C. Hirst and Mr. A. W. Smart are deserving of special mention. Both these officers have devoted themselves to their work and overcome considerable difficulties by their zeal.

160. Of the Officers in charge of Camps or sections the following deserve special mention, Messrs. C. S. Kraal, N. Bedford, T. W. Babonau, C. S. Gasper, C. H. G. Johnson and E. G. Hardinge.

161. Mr. G. Archer who held charge of the Bengal Drawing Office has proved himself an intelligent officer.

162. Mr. R. B. Smart in charge of the Calcutta Suburbs Survey has, as usual, done well.

163. All the remaining Assistants and Supervisors, with two or three exceptions which has been reported to the Surveyor-General, are all reported to have worked very satisfactorily.

I have the honor to be,

SIR,

Your most obedient Servant,

R. T. CRICHTON, MAJOR, I. A.,

Superintendent of Provincial Surveys in Bengal.

APPENDIX I—PART A.

Summary of the outturn of work of the Survey Parties in Bengal for 1904-1905.

DISTRICT.	TRAVERSING.					CADASTRAL SURVEY.				RECORD-WRITING.		TOPOGRAPHICAL SURVEY.
	Number of villages.	Linear miles of chaining	Number of stations at which the theodolite was set up.	Number of Azimuths.	Number of sub-traverses.	Villages.	Fields.	Linear miles of test survey.	Sheets.	Villages.	Fields.	Villages.
1	2	3	4	5	6	7	8	9	10	11	12	13
Government Estates.												
Midnapur—Majnamutha & Jalamutha, etc.	...	...	...	...	...	56	29,477	105	72	441	257,492	...
Private Estates.												
Bhagalpur—Traverse for topographical.	...	85	474	7	8	...	...	74	...	...	...	99
Ditto Ordinary	2,302	5,250	34,132	103	1,800	27	6,873	56	47	27	6,873	...
Purnea—Traverse for topographical.	...	138	836	14	11	...	...	113	...	...	...	61
Ditto Ordinary	841	2,447	16,195	47	730	2,147	1,467,554	8,564	3,010	2,148	1,467,554	...
ackergunge	7	122	788	5	32	986	774,742	4,852	2,032	975	700,327	...
Ditto Sundarbans ...	40	1,094	6,946	80	286	...	...	...	...	...	...	18
Faridpur	3,057	8,057	54,677	303	2,038	...	...	...	...	...	...	...
Ranchi	581	4,171	30,350	308	966	448	413,680	2,954	1,283	541	493,626	...
Singhbhum—Serai Kela, and Kharsawan.	...	...	...	...	...	917	331,783	2,043	1,130	917	331,783	...
Miscellaneous.												
Calcutta Suburbs Survey— Scale 32 inches = 1 mile ...	...	90	2,222	...	...	...	2,286	...	...	...	2,286	...
Scale 50 ft. = 1 inch ...	...	...	...	...	...	...	8,352	...	...	...	8,352	...
Malda—Mauza Taraf Gorapakhia.	1	104	429	8	10	1	...	9	...	...	...	...
Patna—Mauzas Sadikpur Mekra and Sarha.	2	32	152	11	...	...	...	...	...	...	...	...
Patna Division—Diara demarcation.	(a)16	354	1,231	13	...	...	...	...	...	...	...	...
Ranchi—Mauza Chorea	...	...	...	...	...	1	1,886	4		1	1,886	...
Chota Nagpur—Udaipur boundary.	...	49	358	14	...	...	...	...	...	...	...	...
Jalpaiguri—Cooch—Behar boundary.	...	43	286	11	...	...	...	...	...	...	...	...
Total ...	6,847	22,036	149,056	924	5,881	4,583	3,036,633	18,774	7,576	5,050	3,270,179	178

(a) Blocks.

R. T. CRICHTON, MAJOR, I.A.,

Superintendent of Provincial Surveys in Bengal.

APPENDIX I—PART B.

Statement of Outturn and Cost-rates.

District and Estate.	Description of work.	Estimated area to be dealt with in square miles.	Year of inception of operation.	Area surveyed in square miles. During the year under report.	Area surveyed in square miles. Total including previous years.	Cost-rate per square mile. During the year under report.	Cost-rate per square mile. From beginning to end of the year under report.	Balance of area remaining to be surveyed.	Estimated cost of completing the area in column 9.	Estimated final cost rate per square mile.	Remarks. [Explanation of unusually high expenditure.]
1	2	3	4	5	6	7	8	9	10	11	12
Government Estates.						Rs.	Rs.	Rs.	Rs.	Rs.	
Midnapur—Majnamutha and Jalamutha.	Cadastral	648	1904	27	648	207·3	100·4	Nil	Nil	100·4	High rates, owing to small programme and scattered and detached nature of work. Also high rate of payment demanded for coolies.
	Records	635	1904	149	635	104·1	49·7	Nil	Nil	49·7	
Private Estates.											
Bhagalpur	Traverse for topographical.	430	1903	130	430	6·5	19·8	Nil	Nil	19·8	Good rate. Considerable reduction from last year.
	Traverse	3,425	1901	1,250	3,085	31·7	29·0	340	13,200	30·0	Normal rate.
	Cadastral	3,485	1902	24	1,921	85·4	60·9	1,564	125,000	69·5	The rate of 113·9 for cadastral and records in Bhagalpur is good.
	Records	3,485	1902	24	1,900	28·5	64·0	1,585	48,000	48·7	
	Topographical ...	420	1903	123	420	17·9	17·1	Nil	Nil	17·1	Normal rate.
	Traverse for topographical.	495	1903	234	417	4·5	9·7	78	1,600	11·5	Good rate.
	Traverse	4,384	1900	468	4,384	47·8	30·2	Nil	Nil	30·2	High rate, owing to detached area and smal villages.
Purnea	Cadastral	3,723	1901	1,748	3,247	73·5	69·6	476	38,000	70·8	The rate of 109 for cadastral and records in Purnea is very good, although a little higher than last year.
	Records	3,723	1901	1,748	3,247	35·6	36·0	476	19,000	36·5	
	Topographical ...	373	1903	129	295	17·6	15·3	78	1,600	16·4	Normal rate.
	Traverse	3,195	1900	27	3,195	43·4	55·6	Nil	Nil	55·6	Very good rate, considering small and detached area.
Backergunge	Cadastral	3,246	1901	1,168	3,220	108·7	122·0	26	2,600	121·6	Rate of 145 for cadastral and records good. Higher than last year, owing to much smaller fields.
	Records	3,241	1901	950	3,016	36·7	50·9	225	6,800	49·7	
Do. Sundarbans	Traverse	571	1904	571	571	37·0	37·0	Nil	Nil	37·0	These rates are low, because they comprise 9 square miles of the Haringhata River surveyed on 2-inch scale.
	Topographical ...	320	1904	320	320	33·5	33·5	Nil	Nil	33·5	
Faridpur	Traverse	2,281	1904	1,893	1,893	45·4	45·4	388	17,600	45·4	Good rate for traversing in Eastern Bengal.
Ranchi	Traverse	7,128	1901	1,632	3,925	29·5	133·3	3,203	1,06,700	33·3	Good rate.
	Cadastral	7,128	1902	909	2,274	51·5	56·3	4,854	2,42,700	52·0	Rates for cadastral and records in Ranchi and Singbhum very good, owing to free labour and large fields.
	Records	7,128	1902	1,040	2,278	30·6	32·6	4,850	1,45,500	30·8	
Singhbhum—Serai Kela and Kharsawan	Cadastral	594	1904	594	594	47·2	47·2	Nil	Nil	47·2	
	Records	594	1904	594	594	32·6	32·6	Nil	Nil	32·6	
Miscellaneous.											
Calcutta Suburbs Survey	Traverse 32″ ...	17	1903	3	16	...	...	1	67,000	...	
	Cadastral 32″ ...	3	1903	3	3	...	...	Nil		...	
	Records	3	1903	3	3	...	...	Nil		...	
	Cadastral 50 ft. ...	15	1903	2	15	...	...	Nil		...	
	Records	15	1903	2	10	...	...	5		...	
Malda Mauza Taraf Ghorapakhia ...	Traverse	57	1904	57	57	...	...	Nil	Nil	...	
Patna—Mauza Sadikpur Mekra and Sarhan.	Cadastral	4	1904	4	4	...	...	Nil	Nil	...	
	Traverse	6	1904	6	6	...	...	Nil	Nil	...	
Patna Division—Diara demarcation ...	Traverse	55	1904	55	55	...	...	Nil	Nil	...	
Ranchi—Mauza Chorea	Cadastral	2	1904	2	2	...	...	Nil	Nil	...	
	Records	2	1904	2	2	...	...	Nil	Nil	...	
Total and average of columns 7, 8 and 11.	Traverse	22,044	...	6,326	18,034	35·5	36·1	4,010	...	...	
	Cadastral	18,848	...	4,481	11,928	75·4	80·4	6,920	...	...	
	Records	18,826	...	4,512	11,685	36·5	44·3	7,141	...	...	
	Topographical ...	1,113	...	572	1,035	26·5	21·7	78	...	...	

R. T. CRICHTON, MAJOR, I.A.,

Superintendent of Provincial Surveys in Bengal.

APPENDIX II.

Statement of sums expended.

District, &c.	Description of work.	Expenditure incurred during the year under report.				Total expenditure from incep-tion to end of the year under report.			
		Actual (direct) cost.	Share of Superintendent, Provincial Surveys' pay and cost of his office.	Four per cent. charge for instruments.	Total.	Actual (direct) cost.	Share of Superintendent, Provincial Surveys' pay and cost of his office.	Four per cent. charge for instruments.	Total.
1	2	3	4	5	6	7	8	9	10
Government Estates.		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Midnapur—Majnamutha, Jalamutha, etc.	Cadastral	5,164	217	215	5,596	59,369	3,167	2,500	65,036
	Records	14,312	606	597	15,515	28,980	1,403	1,215	31,598
Private Estates.									
Bhagalpur	Traverse for Topographical.	785	33	32	50	7,790	410	327	8,527
	Traverse	36,558	1,538	1,524	39,620	81,623	4,419	3,441	89,483
	Cadastral	1,892	79	78	2,049	1,05,239	7,387	4,504	1,17,130
	Records	633	26	26	685	1,09,034	7,847	4,674	1,21,555
	Topograph'cal ...	2,037	85	84	2,206	6,609	333	277	7,219
Purnea	Traverse for Topographical.	973	40	40	1,053	3,718	191	156	4,065
	Traverse	20,678	869	862	22,409	1,19,809	7,491	5,091	1,32,391
	Cadastral	1,18,573	4,991	4,942	1,28,506	2,07,355	9,811	8,686	2,25,852
	Records	57,446	2,418	2,394	62,258	1,07,502	5,133	4,505	1,17,140
	Topographical ...	2,103	88	87	2,278	4,153	198	173	4,524
Backergunge	Traverse	1,084	45	44	1,173	1,59,220	10,780	6,797	1,76,797
	Cadastral	1,17,134	4,931	4,882	1,26,947	3,58,022	19,985	15,118	3,93,125
	Records	32,138	1,353	1,340	34,831	1,39,364	8,195	5,903	1,53,462
Do. Sundarbans	Traverse	20,279	868	...	21,147	20,279	868	...	21,147
	Topographical ...	10,281	432	...	10,713	10,281	432	...	10,713
Faridpur	Traverse	79,338	3,333	3,307	85,983	79,338	3,333	3,307	85,983
Ranchi	Do.	44,408	1,869	1,851	48,128	1,20,103	6,642	3,912	1,30,657
	Cadastral	43,259	1,821	1,803	46,883	1,16,757	6,464	4,926	1,28,147
	Records	29,412	1,238	1,226	31,876	67,923	3,579	2,860	74,362
Singhbhum—Serai Kela and Kharsawan.	Cadastral	25,871	1,089	1,078	28,038	25,871	1,089	1,078	28,038
	Records	17,813	49	742	19,304	17,813	749	742	19,304
Miscellaneous.									
Calcutta Suburbs Survey, including Panchannagram.	Traverse	20,749	872	...	21,621	47,376	2,471	...	49,847
	Cadastral	30,044	1,263	...	31,307	93,573	5,112	...	98,685
	Records	8,465	355	...	8,820	8,465	355	...	8,820
Malda—Mauza Taraf Ghorapakhia ...	Traverse	688	28	28	744	688	28	28	744
	Cadastral	96	4	4	104	96	4	4	104
Patna—Mauza Sadikpur Mekra and Sarhan.	Traverse	209	8	8	225	209	8	8	225
Patna Division—Diara demarcation ...	Do.	2,390	99	99	2,588	2,390	99	99	2,588
Ranchi—Mauza Chorea	Cadastral	100	4	4	108	100	4	4	108
	Records	108	4	4	116	108	4	4	116
Chota Nagpur—Udaipur State boundary.	Traverse	913	38	38	989	2,631	130	110	2,871
Jalpaiguri—Cooch Behar Boundary ...	Do.	3,034	127	126	3,287	3,034	127	126	3,287
Bhagalpur Municipality	Records	192	8	8	208	1,298	66	54	1,418
Do. Badars	Cadastral	719	30	30	779	5,515	289	232	6,036
Do. Arrears	Do.	99	18	17	434	399	18	17	434
Do. Relaying pillars on Nepal boundary.	Traverse	97	4	4	105	97	4	4	105
Purnea Badars	Cadastral	10,157	427	423	11,007	10,157	427	423	11,007
Do. Arrears	Records	2,723	114	113	2,950	2,723	114	113	2,950
Darbhanga—Mauzas Hardaspur and Chaparsan.	Do.	79	4	3	86	298	14	12	324
Ranchi Badars	Cadastral	4,608	194	192	4,994	4,608	194	192	4,994
Do. Arrears	Records	11,439	480	477	12,376	11,439	480	477	12,396
Gaya—Deo Wards Estate ...	Cadastral	(a)4,786	...	...	4,786	4,786	...	...	4,786
Training Kanungoes in Traverse work	Traverse	406	17	17	440	406	17	17	440
Monghyr Municipality	Cadastral	2,441	102	101	2,644	3,927	179	163	4,269
	Records	621	29	26	676	621	29	26	676
Monghyr—Mauza Darobust	Traverse	69	3	3	75	851	50	36	937
Patna—Mauza Gora *urf* Katora ...	Do.	167	6	6	179	295	12	12	319
	Cadastral	38	2	2	42	38	2	2	42
Shahabad—Umarpur estate	Traverse	378	16	15	409	378	16	15	409
Singhbhum—Serai Kela and Kharsawan—Arrears.	Do.	3,040	125	...	3,165	3,040	125	...	3,165
Ranchi—Amins training class	Cadastral	181	7	7	195	1,772	106	74	1,952
Midnapur—Badars	Do.	607	25	25	657	607	25	25	657
Do. Arrears	Records	21,376	893	890	23,159	21,376	893	890	23,159
Backergunge Badars	Cadastral	2,000	85	83	2,168	2,087	89	87	2,263
Do. Arrears	Records	9,045	376	376	9,797	9,045	376	376	9,797
Do. do.	Traverse	459	19	19	497	459	19	19	497
Do. Rubnabad islands ...	Records	184	8	8	200	184	8	8	200
24-Parganas—Sundarbans	Traverse	8,279	348	...	8,627	8,279	348	...	8,627
Backergunge Char Bagola	Do.	134	5	45	144	134	5	5	144
Ranchi—Training School for Settlement Officers.	Cadastral	1,100	46	46	1,192	1,100	46	46	1,192
Titaghur—Training School for Settlement Officers.	Do.	3,673	154	153	3,980	3,673	154	153	3,980
Alipore Cantonment	Traverse	144	6	6	156	144	6	6	156
	Cadastral	336	14	...	350	336	14	...	350
Total ...	Traverse	2,45,259	10,321	8,034	2,63,614	6,62,291	37 304	23,516	7,23,411
	Cadastral	3,73,178	15,503	14,085	4,02,766	10,05,337	54,566	38,234	10,98,187
	Records	2,05,986	8,661	8,230	2,22,877	5,26,173	29,245	21,859	5,77,277
	Topographical ...	14,421	605	171	15,197	21,043	963	450	22,456
Bengal Drawing Office	Standard maps ...	15,088	630	...	15,718	56,758	3,401	...	60,159
	Badar section ...	3,303	139	...	3,442	10,220	603	...	10,823
	Record section ...	4,032	168	...	4,200	10,842	538	...	11,380
	District maps ...	692	29	..	721	692	29	...	721
	Thana maps ...	434	17	...	451	5,209	344	...	5,553
	Orissa Badars ...	221	9	...	230	7,224	525	...	17,749
	Reproduction of village maps.	71,277	2,991	...	74,268	1,91,301	10,827	...	2,02,128
	Reproduction for attestation purposes.	1,142	46	...	1,188	1,142	46	...	1,188
	Trijunction mark maps.	1,269	51	...	1,320	1,269	51	...	1,320
Grand Total ...		9,36,302	39,170	30,520	10,05,992	24,99,551	1,387	84,059	27,32,352

(a) This Rs. 4,786 is a book debit charge made by order of A. G. B.

R. T. Crichton, Major, I.A.,
Superintendent of Provincial Surveys in Bengal.

B. S. Press—6702—360—20-12-1905—J. A. M.

REVENUE DEPARTMENT.

LAND REVENUE.

CALCUTTA, THE 10TH APRIL 1906.

RESOLUTION—No. 1907.

READ—

The Survey and Settlement Reports for the year ending the 30th September 1905, with the remarks of the Board of Revenue thereon.

THE Survey and Settlement Reports for the year ending the 30th September 1905 have been prepared generally in accordance with the orders of Government and are well within the prescribed maximum limit of pages; but there has been considerable delay in their submission, which, it is hoped, will not recur.

2. The present Reports deal with the province before the eastern districts had been transferred to the new province. Exclusive of the survey of the suburbs of Calcutta, which has been undertaken at the request of the Calcutta Corporation, and of certain minor operations, the work of the Survey and Settlement Departments extended over portions of fourteen districts lying in eight Divisions. With a few minor exceptions, which were unavoidable, the full programme has been worked up to and even exceeded. The traverse survey covered 6,326 square miles, as against 5,028 square miles in the year ending the 30th September 1904, while the areas cadastrally and topographically surveyed were 4,667 and 572 square miles respectively, as against 5044·77 and 463 square miles, the corresponding figures for the previous year. The area for which a record-of-rights was completed during the year, under the control of the Director of Land Records, was 2,404 square miles, bringing up the total area thus dealt with in the Province to 37,635 square miles.

3. Both Reports furnish ample evidence of continued endeavours to secure efficient administration at a minimum of cost. The marginal table shows that there was a satisfactory reduction in the cost rate of traverse survey everywhere save in the district of Purnea. The exceptional rate in that district is due to the fact that only detached areas, comprising small villages, remained to complete the district; and the Lieutenant-Governor notices with satisfaction that notwithstanding the high cost rate of the year 1904-05, the traverse survey of the entire district of Purnea has been completed at the moderate rate of Rs. 30·2 per square mile. The district of Faridpur was taken in hand in the year under report, and it is noticeable that, even in the first year of the operations and with the well-known difficulties peculiar to Eastern Bengal, the cost rate has been as low as Rs. 45·4 per square mile. It is gratifying that in the district of Ranchi, where a low cost rate is specially desirable, the cost of cadastral survey and initial record-writing, owing to larger fields and the supply of free labour by the people, amounted to only Rs. 82·1 per square mile, as against Rs. 93·2 in the previous year. The cost rates* of this branch of the work in the districts of Bhagalpur, Bakarganj and Purnea were moderate, although owing to the smaller fields in the area dealt with they were a little higher than in the previous year. In the case of the Majnamutha, Jalamutha and other estates in the district of Midnapore the cost rate for the year works out to Rs. 311·4 per square mile. The incidence of cost of cadastral survey and initial record-writing on the total

District.	Cost rate of traverse survey per square mile. 1903-04. Rs.	1904-05. Rs.
Bhagalpur ...	35·8	31·7
Purnea ...	26·6	47·8
Bakarganj ...	57·1	43·4
Faridpur ...	...	45·4
Ranchi ...	32·0	29·5

	1903-04. Rs.	1904-05. Rs.
*Bhagalpur ...	82·7	113·9
Bakarganj ...	130	145·4
Purnea ...	101·5	109

area of the estates in Midnapur, now completed, is however Rs. 150 per square mile. Having regard to the water-logged condition of the country, and the fact that the estates are not compactly situated but lie in no less than 21 Parganas, as well as the small average size of the revenue villages (·34 of a square mile) and of fields (·37 of an acre), and the high rates of wages of coolies, the Lieutenant-Governor is glad to find that it has been found possible to carry out the operations at such a moderate rate.

4. Experience having shown that the dual control of the Survey and Settlement Departments over cadastral survey and initial record-writing was no longer necessary in view of the experience gained by the Settlement Department, it was recommended, in consultation with the Surveyor-General, that these items of work in Eastern Bengal and Chota Nagpur should be transferred to the Settlement Department. These recommendations were accepted by the Supreme Government and have been given effect to from the beginning of the field season of 1905. The settlement staffs concerned were put through a special course of training in cadastral survey under the Survey Department at the recess camps at Ranchi and Tittaghur; and, as a further means of ensuring sufficient accuracy in the cadastral maps prepared under the supervision of the Settlement Department, an officer of the Survey Department has been attached to each settlement party as a professional adviser of the Settlement Officer.

5. Other administrative changes have been made, or were proposed during the year and are still under consideration. Among these may be mentioned the improvement of the system of draft publication of records. A Bill to amend the Bengal Tenancy Act, including measures to give greater authority to the record-of-rights when such record has been duly prepared and published, has been referred to the Government of India for sanction to its introduction. The joint report of the Settlement Officer of Ranchi and the Commissioner of the Chota Nagpur Division, alluded to in paragraph 4 of the Government Resolution No. 1458L.R., dated the 13th March 1905, on the Survey and Settlement Reports for the year ending the 30th September 1904, has been received, and proposals for amending the Chota Nagpur Landlord and Tenant Procedure Act so as to remove the grievances of Mundaris are now under consideration.

6. In the Resolution quoted in the preceding paragraph the Lieutenant-Governor had occasion to notice the high proportion (16 per cent.) of non-occupancy holdings as shown by the records attested in the district of Ranchi during the year 1903-04. The present Report brings to light a similar state of affairs in the records attested during 1904-05, the proportion of non-occupancy holdings being 14·6 per cent. It is stated by the Director of Land Records and the Settlement Officer that the figures clearly show the necessity of further amending the law on this subject. The Lieutenant-Governor is not satisfied that sufficient materials have yet been collected for a definite decision on this important matter which, however, will be separately considered.

7. The settlement of rents in the Banki Government estate in the district of Cuttack resulted in an enhancement of 19·5 per cent. on the existing rental. The Lieutenant-Governor is glad that no objection has been filed against the rents settled and that they are being paid readily.

8. It is also satisfactory that the enhancement of rents in the zamindari estates in the Sonthal Parganas has been moderate on the whole notwithstanding the great increase in cultivation since the previous settlement.

9. The special attention of Government has been directed during the last few years to ensuring the use of settlement records in all branches of the administration. In paragraphs 4 and 10 of the Resolution on the Survey and Settlement Reports for the year ending the 30th September 1904, mention was made of the steps which were in contemplation, or had been taken, in this direction and His Honour is much gratified to notice that they have already met with marked success in the district of Ranchi and elsewhere. The Director of Land Records reports that in Ranchi, where the preparation of a record-of-rights has been completed in respect of only a small portion of tth district, the production of *parchas* (abbreviated khatians) is generally insisted on the criminal cases as well as in rent suits, and the settlement records are now freely consulted by the majority of the Courts and Executive officers; a

perceptible effect on agrarian oppression such as illegal dispossession, fraudulent registration and unlawful enhancement of rents, has already been noticed. In other districts completely or partially surveyed the same improvement is reported, and records are freely consulted by the revenue and criminal courts and in the Registration offices in tracts where records-of-rights have been prepared. The proposal to depute a few munsifs annually to settlement duty, in order to enable them to acquire a practical knowledge of the settlement procedure and the validity which attaches to the record at its various stages, has been approved by the High Court and sanctioned by the Supreme Government. Six munsifs are now employed as Assistant Settlement Officers in the settlements of Bihar, and Ranchi.

10. The orders of the Secretary of State on the question of maintenance of the settlement records in Orissa and Bihar have now been received. It has been decided that in the temporarily-settled districts of Orissa, the records should be kept up continuously and a scheme for the purpose is being prepared. With regard to Bihar, however, the decision of the question has been postponed until Government is in a position to frame proposals based on the experience gained of the working of the system in Orissa. There appears to be still room for improvement in the record of mutations and the maintenance of rent-rolls in Government and Wards' Estates, and the Lieutenant-Governor trusts that the Board of Revenue will take steps to render the existing system more effective.

11. The Lieutenant-Governor notices that efforts are being made to give effect to the rules laid down for the maintenance of boundary marks. He trusts that the maintenance of marks will be rendered more effective by the use of maps, now being prescribed under the instructions of the Board of Revenue, of a scale sufficiently large to show clearly the position of such marks.

12. Sir Andrew Fraser has much pleasure in acknowledging the services rendered by Major Crichton and by Messrs. Maddox, Beatson-Bell, McPherson, Lister and Coupland. It is very largely owing to the tact and good judgment shown by Major Crichton that the dual control of the Survey and Settlement Departments over cadastral survey and initial record-writing proved so successful in the past as has actually been the case. The Lieutenant-Governor's acknowledgments are also due to Messrs. Cumming, Jack and Allanson, and to the other officers named in the concluding chapters of the two Reports.

13. Extracts from the Reports are published for information.

ORDER.—Ordered that this Resolution be published in the *Calcutta Gazette*, and that a copy of it with copies of the two Reports be submitted to the Government of India.

By order of the Lieutenant-Governor of Bengal,

R. W. CARLYLE,
Chief Secy. to the Govt. of Bengal.

No. 1908.

COPY, with a copy of the Survey Report, forwarded to the Deputy Surveyor-General in charge, Revenue Branch Survey of India, for information.

No. 1909.

COPY, with a copy of the Settlement Report, forwarded to the Appointment Department of this Government for information with special reference to paragraph 12 above.

By order of the Lieutenant-Governor of Bengal,

M. C. McALPIN,
Under-Secy. to the Government of Bengal.

CALCUTTA,
The 10th April 1906.

B. S. Press—21728—563—20-4-1906—J. S.

ANNUAL REPORT

ON THE

SURVEY OPERATIONS IN BENGAL

DURING THE YEAR

1905-06.

From 1st October 1905 to 30th September 1906.

Calcutta:

THE BENGAL SECRETARIAT BOOK DEPÔT.

1907.

Published at the BENGAL SECRETARIAT BOOK DEPÓT,
Writers' Buildings, Calcutta.

OFFICIAL AGENTS.

In India—

MESSRS. THACKER, SPINK & Co., Calcutta and Simla.
MESSRS. NEWMAN & Co., Calcutta.
MESSRS. HIGGINBOTHAM & Co., Madras.
MESSRS. THACKER & Co., LD., Bombay.
MESSRS. A. J. COMBRIDGE & Co., Bombay.
THE SUPERINTENDENT, AMERICAN BAPTIST MISSION PRESS, Rangoon.
MRS. RADHABAI ATMARAM SAGOON, Bombay.
MESSRS. R. CAMBRAY & Co., Calcutta.
RAI SAHIB M. GULAB SINGH & SONS, Proprietors of the Mufid-i-am Press, Lahore, Punjab.
MESSRS. THOMPSON & Co., Madras.
MESSRS. S. MARTHY & Co., Madras.
MESSRS. S. K. LAHIRI & Co., Printers and Booksellers, College Street, Calcutta.
MESSRS. V. KALYANARAMA IYER & Co., Booksellers, &c., Madras.
MESSRS. D. B. TARAPOREVALA, SONS & Co., Booksellers, Bombay.
MESSRS. G. A. NATESON & Co., Madras.
MR. N. B. MATHUR, Superintendent, Nazir Kanum Hind Press, Allahabad.
THE CALCUTTA SCHOOL BOOK SOCIETY.
MR. SUNDER PANDURANG, Bombay.
MESSRS. A. M. and J. FERGUSON, Ceylon.
MESSRS. TEMPLE & Co., Madras.
MESSRS. COMBRIDGE & Co., Madras.
MESSRS. A. R. PILLAI & Co., Trivandrum.

In England—

MR. E. A. ARNOLD, 41 & 43 Maddox Street, Bond Street, London, W.
MESSRS. CONSTABLE & Co., 16 James Street, Haymarket, London, W.
MESSRS. GRINDLAY & Co., 54 Parliament Street, London, S. W.
MESSRS. KEGAN, PAUL, TRENCH, TRÜBNER & Co., 43 Gerrard Street, Soho, London, W.
MR. B. ALFRED QUARITCH, 15 Piccadilly, London, W.
MESSRS. P. S. KING & SON, 2 & 4 Great Smith Street, Westminster, London, S. W.
MESSRS. H. S. KING & Co., 65 Cornhill, London, E. C.
MR. B. H. BLACKWELL, 50-51 Broad Street, Oxford.
MESSRS, DEIGHTON BELL & Co., Cambridge.

On the Continent—

MESSRS. R. FRIEDLÄNDER & SOHN, Berlin, N. W. Carlstrasse, 11.
MR. OTTO HARRASSOWITZ, Leipzig.
MR. RUDOLF HAUPT, Halle-a-S, Germany.
MR. KARL HIERSEMANN, Leipzig.
MR. ERNEST LEROUX, 28 Rue Bonaparte, Paris.
MR. MARTINUS NIJHOFF, The Hague.

[Maximum limit 24 pages, excluding appendices.]

INDEX TO CONTENTS.

CHAPTER I.

PAGE

GENERAL REMARKS ON THE PROVINCIAL SURVEYS 1

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND RECORDS OF RIGHTS IN TEMPORARILY-SETTLED AND GOVERNMENT ESTATES UNDER SETTLEMENT OF RENTS AND LAND REVENUE.

PART II.—REPORTS ON SURVEYS AND RECORDS-OF-RIGHTS IN PRIVATE ESTATES.

BHAGALPUR DIVISION	BHAGALPUR DISTRICT	TRAVERSE SURVEY	2
	„ „	CADASTRAL „	3
	PURNEA „	TRAVERSE „	*ib.*
	„ „	CADASTRAL „	*ib.*
	„ „	TOPOGRAPHICAL „	*ib.*
	MONGHYR „	TRAVERSE „	4
	„ „	„ AND TRIANGULATION	*ib.*
	SONTHAL PARGANAS	TRAVERSE SURVEY	*ib.*
	„ „	TOPOGRAPHICAL SURVEY	*ib.*
CHOTA NAGPUR „	... RANCHI DISTRICT	TRAVERSE „	5
PRESIDENCY „	... MIDNAPORE „	TRAVERSE SURVEY	*ib.*
BHAGALPUR „	... SONTHAL PARGANAS „	„	*ib.*
CHOTA NAGPUR „	... SINGHBHUM DISTRICT	TRAVERSE „	*ib.*
PRESIDENCY „	... KHULNA „	„ „	6
	24-PARGANAS „	(SUNDARBANS) TRAVERSE SURVEY	*ib.*
	„ „	„ TOPOGRAPHICAL „	7

PART III.—REPORTS ON MISCELLANEOUS SURVEYS.

PRESIDENCY DIVISION	24-PARGANAS	CALCUTTA SUBURBS SURVEY	7
PATNA „	PATNA DISTRICT	SADIKPUR AND SARAN	8
	„ DIVISION	DIARA SURVEY	*ib.*
BHAGALPUR „	DARJEELING	NEPAL BOUNDARY	*ib.*
	PURNEA DISTRICT	PURNEA MUNICIPALITY	*ib.*
	BHAGALPUR „	BANELI RAJ VILLAGE	9
	NEPAL *cum* PURNEA AND BHAGALPUR	BOUNDARY	*ib.*

PART IV.—REPORT ON THE BENGAL DRAWING OFFICE.

STANDARD MAPPING SECTION 9
TRAVERSE CHART SECTION 10
TRIJUNCTION MARKS AND THANA MAPPING SECTION . . . . . *ib.*
REPRODUCTION OF VILLAGE MAPS SECTION 11
BADAR SECTION 13
MAP RECORD SECTION . . . . . *ib.*

CHAPTER III.

PAGE.

PART I.—TOURS OF SUPERINTENDENT OF PROVINCIAL SURVEYS . . 14

„ *II.*—SERVICES OF OFFICERS . . . . . .

LIST OF APPENDICES.

APPENDIX I.—PART A.—SUMMARY OF OUTTURN OF WORK . . .

PART B.—STATEMENT OF OUTTURN AND COST RATES . .

II.—EXPENDITURE STATEMENT . . . . . .

LIST OF INDEX MAPS.

PROVINCE OF BENGAL . . . . . *To face page* 1

BHAGALPUR DISTRICT . . . . . „ „ 2

PURNEA „ . . . . . „ „ 3

MONGHYR „ . . . . . „ „ 4

SONTHAL PARGANAS . . . . . „ „ *ib.*

RANCHI DISTRICT . . . . . „ „ 5

MIDNAPORE „ . . . . . „ „ *ib.*

SINGHBHUM „ . . . . . „ „ *ib.*

KHULNA „ . . . . . „ „ 6

24-PARGANAS . . . . . „ „ *ib.*

PANCHANNOGRAM . . . . . „ „ 7

ANNUAL REPORT

OF

THE SUPERINTENDENT OF PROVINCIAL SURVEYS, BENGAL

ON THE

SURVEY AND RECORD-OF-RIGHTS OPERATIONS IN BENGAL

DURING THE YEAR 1905-1906.

No. 3887 / R-7—75.

CRICHTON, I.A.,

Superintendent of Provincial Surveys in Bengal,

TO THE SECRETARY TO THE BOARD OF REVENUE, LOWER PROVINCES.

Dated Dinapore, the 7th November 1906.

SIR,

I HAVE the honour to submit the Report on the Survey Operations in Bengal during the past survey year, namely, from 1st October 1905 to 30th September 1906.

2. I have been in charge for the whole period under report.

CHAPTER I.

General remarks.

3. The outturn of the year, namely, 5,591 square miles of traverse survey, 1,769 square miles of cadastral survey, 1,601 square miles of record-writing and 1,095 square miles of topographical survey is considerably less than that of last year. The full programme of the year has been worked up to in every respect, in most cases slightly exceeded, except the record-writing programme which was reduced during the field season at the request of the Settlement Officer of Bhagalpur.

Changes during the year.

4. In paragraph 7 of last year's report reference was made to the decision to hand over cadastral surveys in Chota Nagpur and Eastern Bengal to the Settlement Department. In October 1905 the establishment and equipment of the two Cadastral Camps of No. 5 Party, (Chota Nagpur) and of the Cadastral Camp of No. 6 Party (Eastern Bengal) was handed over to the Settlement authorities.

5. All work relating to the districts lately transferred from Bengal to Eastern Bengal and Assam and all the work done in the Bengal Drawing Office for Eastern Bengal and Assam have been excluded from this report and reported separately to that Government.

6. The foregoing facts account for the reduction in outturn given in this report, as compared with the reports of previous years.

Training of Junior Civilians.

7. During the season seven junior civilians, viz., Messrs. B. A. Collins, R. J. A. Routh, H. T. Cullis, C. L. Philip, P. S. Shettle, H. E. Spry, and W. H. Nelson, went through the usual course of Training in Traverse and Cadastral Surveying with No. 4 Party (Bihar).

Training of Kanungoes.

8. Two training classes for kanungoes were also held during th[illegible]

Permanent marking of village trijunctions.

9. The instructions contained in the note in Appendix I of [illegible] Settlement Manual to the effect that District Officers should ha[illegible] tions demarcated by the village *chaukidars* have not been given [illegible] Survey Officers have been directed to call the attention of the [illegible] concerned to this note in plenty of time before the comm[illegible] work, and there should be little necessity to move trijunction[illegible]

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND RECORDS-OF-RIGHTS IN TEMPORARILY-SETTLED AND GOVERNMENT ESTATES UNDER SETTLEMENT OF RENTS, AND LAND REVENUE.—*NIL.*

PART II.—REPORTS ON SURVEYS AND RECORDS-OF-RIGHTS IN PRIVATE ESTATES.

BHAGALPUR DISTRICT.

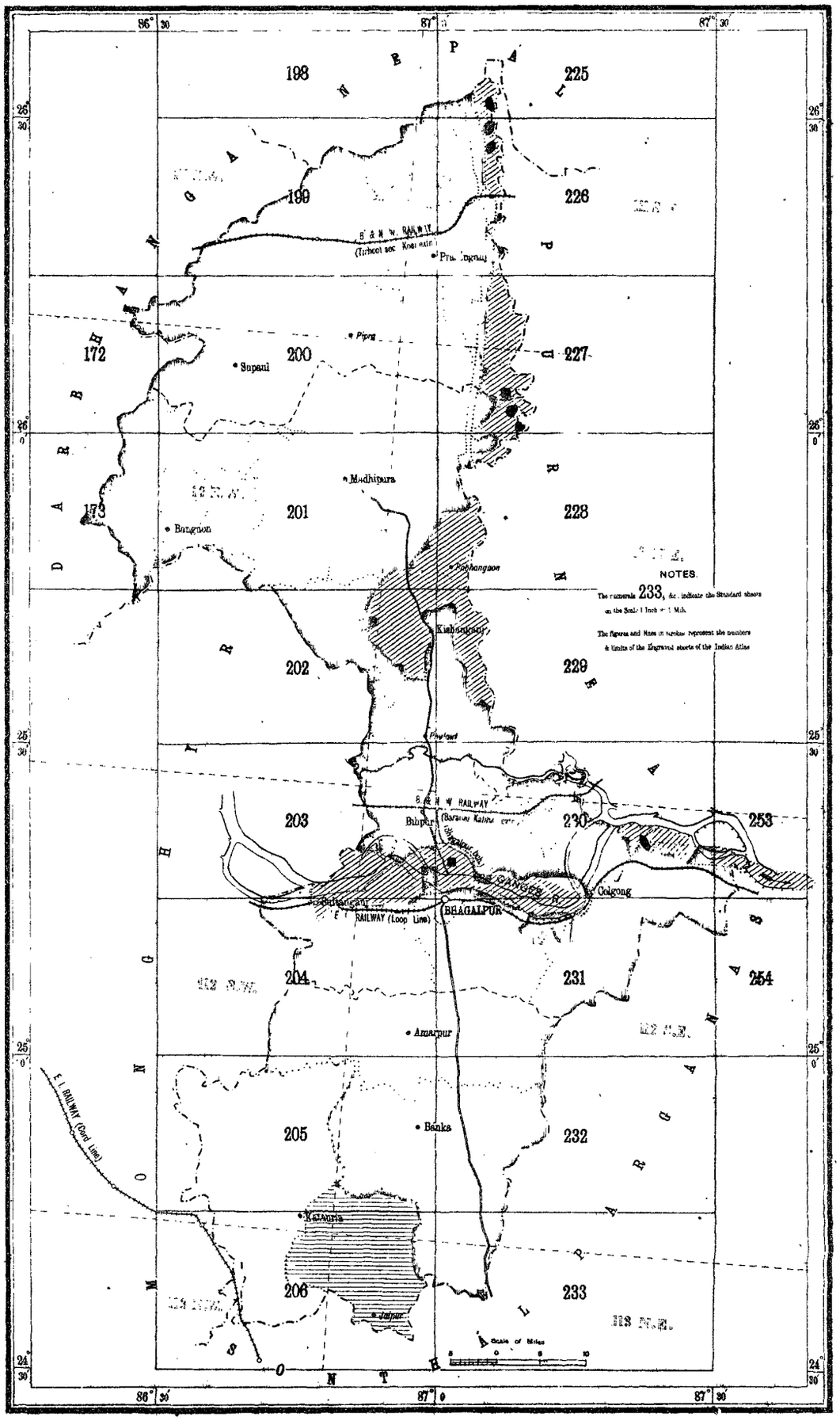
Traverse Survey.

10. In this district only an area of 363 square miles of thana Katauria remained for traverse survey and this has been completed duri[illegible] the year under report.

BENGAL SURVEY.

INDEX TO THE TRAVERSE & CADASTRAL SURVEYS IN DISTRICT BHÁGALPUR.

1905-06. No. 4 PARTY.



No. 236-E. Bengal—Aug. 06—525

Photo. S. I. O., Calcutta.

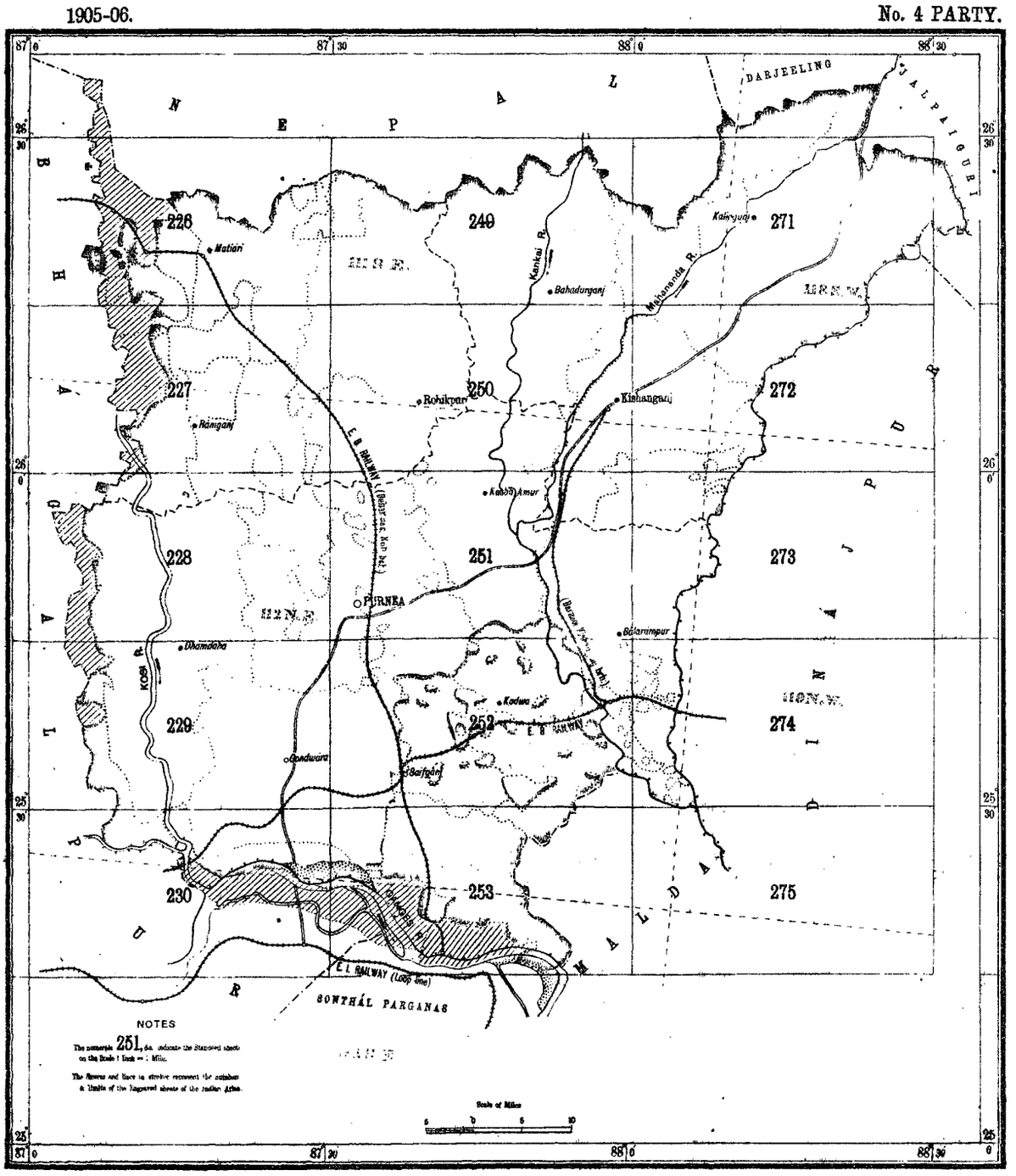
REFERENCES.

- Cadastrally Surveyed with Records in previous Seasons
- Traversed & Topographically Surveyed 4 inch Scale, in previous Seasons
- Cadastrally Surveyed with Records in 1905-06
- Cadastrally Surveyed without Records in 1905-06
- Traversed & Topographically Surveyed 4-inch Scale in 1905-06
- Traversed in advance in 1905-06
- District.... Boundary
- Sub-Division do
- Thana.....do

BENGAL SURVEY.

INDEX TO THE TRAVERSE & CADASTRAL SURVEYS IN DISTRICT PURNEA.

1905-06. No. 4 PARTY.



No. 236 E., Imperial—Aug. 06—625

Photo. S. I. O., Calcutta

REFERENCES.

Cadastrally Surveyed with Records in previous Seasons

Topographically Surveyed on 4-inch Scale in previous Seasons

Cadastrally Surveyed with Records in 1905-06

Traversed & Topographically Surveyed on 16-inch Scale, in 1905-06

District ... Boundary

Sub-Division do.

Thana ..... do

11. There are 9,408 new theodolite stations, which have been marked by 311 stones, 8,501 clay cylinders and 596 pegs.

12. One Great Trigonometrical station has been connected with, and the angular work checked against, the results of 36 azimuth observations. The mean magnetic variation is 1° 41′ east.

13. The demarcation was good and consequently the comparison of the rough 4-inch plots against the old revenue survey boundaries proved well.

14. The work has been plotted on 460 sheets on the 16-inch scale, but the Settlement Officer now asks that, as a special case, plots by *tolas* may be supplied. Some of the work will therefore have to be replotted.

15. The entire work has proved well mathematically and all computations are practically complete.

Cadastral Survey.

16. The areas accomplished are 1,270 square miles of cadastral survey and 1,108 square miles of record-writing. The deficit of 162 square miles of record-writing lies in one compact block in thana Katauria. The record-writing of this block was postponed to season 1906-07 at the request of the Settlement Department.

17. The check surveys give an incidence of 4·6 linear miles of test survey to each square mile of detail. The entries against 2,72,956 plots were checked by the survey staff which gives an average of 30 per cent. on the whole number of plots.

18. There were 612 boundary disputes and 39,752 interior disputes, of which 596 of the former and 35,208 of the latter have been settled. The balance will be attended to at the attestation stage.

19. Attendance and demarcation are reported to have been good.

PURNEA DISTRICT.

Traverse Survey.

20. Except for 7 square miles of up-lands, the only portion of this district remaining for traverse was the Ganges *diara.*

21. The area of 70 square miles traversed during the season consists of 7 square miles of up-lands for cadastral survey, 30 square miles of *diara* for cadastral survey, and 33 square miles of *diara* for topographical survey.

22. There were 600 new theodolite stations which have been marked by 8 stones, 28 cylinders and 564 pegs.

Cadastral Survey.

23. The area dealt with cadastrally during the season under report consisted of the portions of thana Kadwa and Saifganj, which had been traversed in advance during the foregoing season and the Ganges *diara* which was traversed during the same season. The total outturn was 485 square miles of cadastral survey and record writing.

24. The incidence of linear miles of test-survey to each square mile of detail was 4·9. The entries against 68,676 plots were checked by the survey staff. This gives on average of 28 per cent.

25. There were 290 boundary and 15,097 interior disputes, of which 270 and 14,529 respectively, have been settled.

26. Both attendance and demarcation were fair; the health of the establishment was good.

Topographical Survey.

27. During the season 23 square miles of the Ganges *diara* have been topographically surveyed on the 16-inch scale.

28. The plane-table sections were constantly checked in the field during the progress of the work and also 39 linear miles of test survey were carried out.

29. As the topographical survey of the adjoining tract of the Sonthal Parganas was carried out also on these sheets it is impossible to give separate figures for the number of sheets.

30. The maps are complete in every respect and the reductions to the 4-inch scale, which were necessary in order to allow of village boundaries being entered, are under despatch to the Bengal Drawing Office for standard mapping purposes.

Monghyr District.

Traverse Survey.

31. Traverse operations were extended to South Monghyr during the year under report. The area accomplished was 1,217 square miles exclusive of 275 square miles of hilly and jungly country, which are to be excluded from the cadastral operations, *vide* paragraph 36 of the report.

32. In the above-mentioned 1,217 square miles there are 26,107 new theodolite stations which have been marked by 1,678 stones, 22,620 clay cylinders and 1,809 pegs.

33. Six Great Trigonometrical Stations have been connected with, and the angular work checked by 120 observations for azimuth. The mean magnetic variation is 1°44′ east.

34. Demarcation was good, but Captain Hirst reports that work was somewhat delayed along the Hazaribagh boundary owing to a misunderstanding on the part of the inhabitants of the villages on the border.

35. The computations are all practically complete and the season's outturn has been plotted on 1,543 sheets on the 16-inch scale.

Traverse and Triangulation.

36. Within the periphery of the thanas for traverse survey during the season, lies a block of 275 square miles of absolutely hilly and jungly country containing practically no cultivation; such little as there is being of a shifting character. This tract is unsuitable for a large scale cadastral survey, but as the District Officers complain of the insufficiency and inaccuracy of the existing one-inch to the mile maps, it was decided to deal with this tract topographically on the two-inch=one mile scale.

37. During the year this tract has been triangulated and a certain amount of necessary traversing carried out and the detail survey will be attended to next season.

District Sonthal Parganas.

Traverse Survey.

38. In order to complete the Ganges *diara* and join on to the former survey of the Damin-i-koh an area of 22 square miles was traversed of the Sonthal Parganas.

39. There were 81 new stations, all of which were marked by pegs.

The work has been plotted on 12 sheets on the 16-inch scale.

40. As the survey operations in Bihar are now extending westwards the eastern limit of the Ganges *diara* survey has been reached, therefore in order to ensure an easy and proper connection when the *diara* between districts Murshidabad and Malda is taken up, the last stations of the present survey have been marked by two brick pillars on opposite sides of the Ganges.

Topographical Survey.

41. The area of 22 square miles traversed during the season was also topographically surveyed on the 16-inch scale.

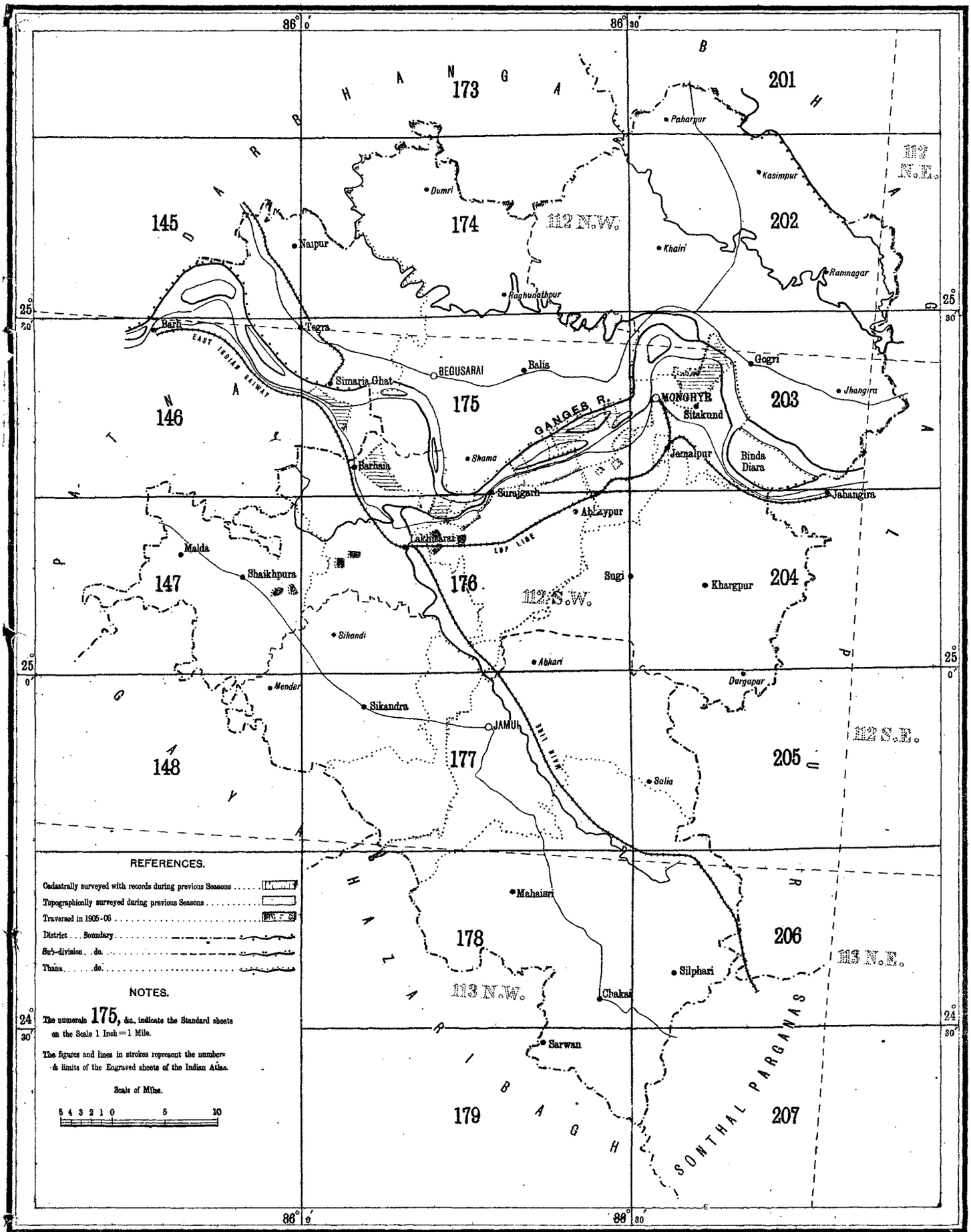
In addition to constant inspection in the field 37 linear miles of test survey were run.

42. The plane table sections are all complete, but, as explained in paragraph 29 of this report, separate figures for the number of sheets cannot be supplied. The district boundary has been clearly marked in the sheets and the 4-inch reductions are ready for despatch to the Bengal Drawing Office.

BENGAL.

INDEX TO THE CADASTRAL SURVEY IN DIST. MONGHYR.

1905-06 No. 4 PARTY.



REFERENCES.

Cadastrally surveyed with records during previous Seasons .....

Topographically surveyed during previous Seasons .....

Traversed in 1905-06 .....

District . . . Boundary .....

Sub-division . . do. .....

Thana . . . . . do. .....

NOTES.

The numerals 175, &c., indicate the Standard sheets on the Scale 1 Inch = 1 Mile.

The figures and lines in strokes represent the numbers & limits of the Engraved sheets of the Indian Atlas.

Scale of Miles.

5 4 3 2 1 0 5 10

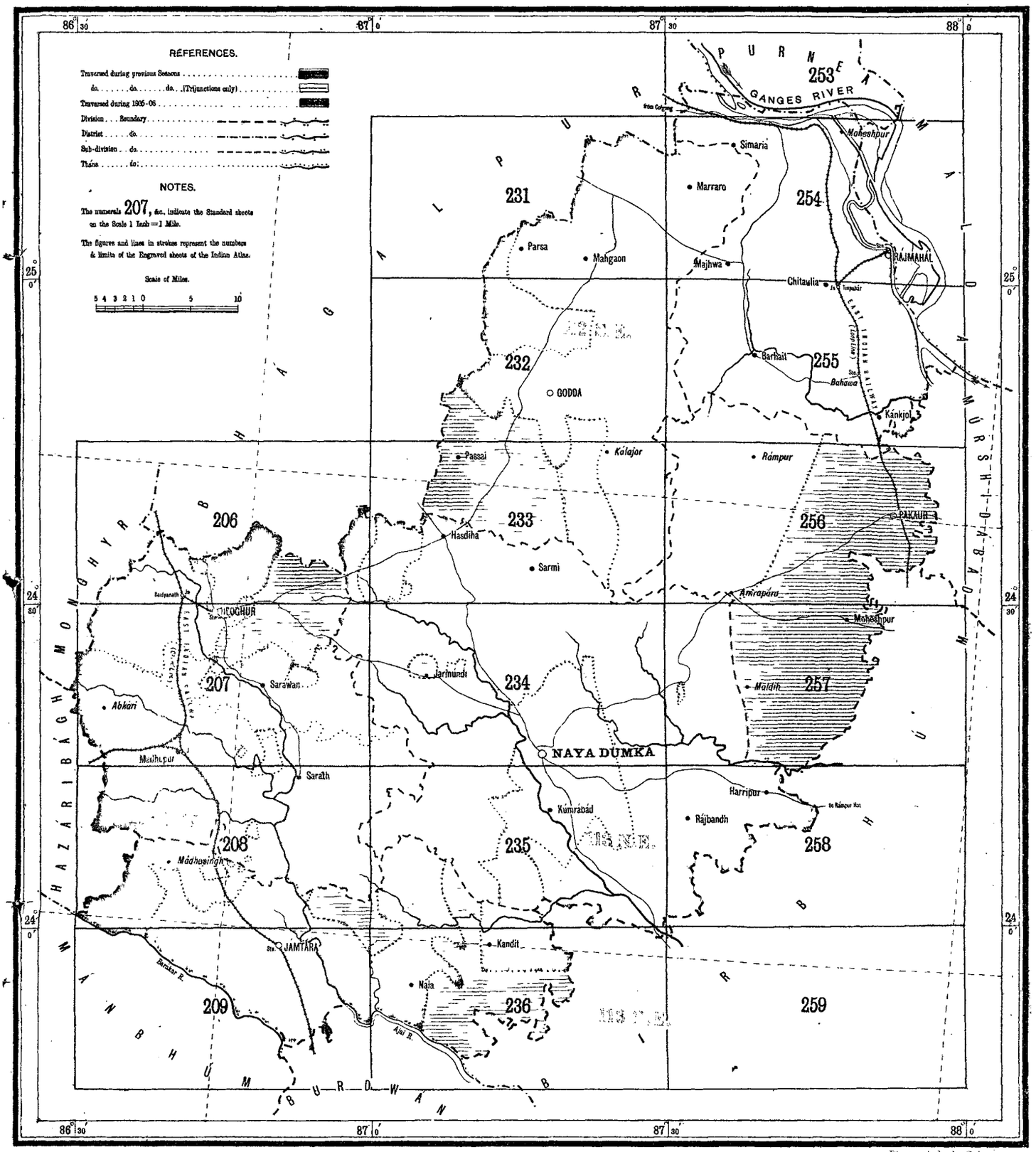
No. 204 E. Bengal.—Sept. 06.—525

Photo S. I. O. Calcutta

BENGAL.

INDEX TO THE TRAVERSE SURVEY IN DIST. SONTHAL PARGANAS.

1905-06 No. 5 PARTY.



No. 994. Bengal.—Sept. 06.—535 Photo S. I. O., Calcutta

BENGAL SURVEY.

1905-06. **INDEX TO THE TRAVERSE & CADASTRAL SURVEYS IN DISTRICT RÁNCHI.** No. 5 PARTY.

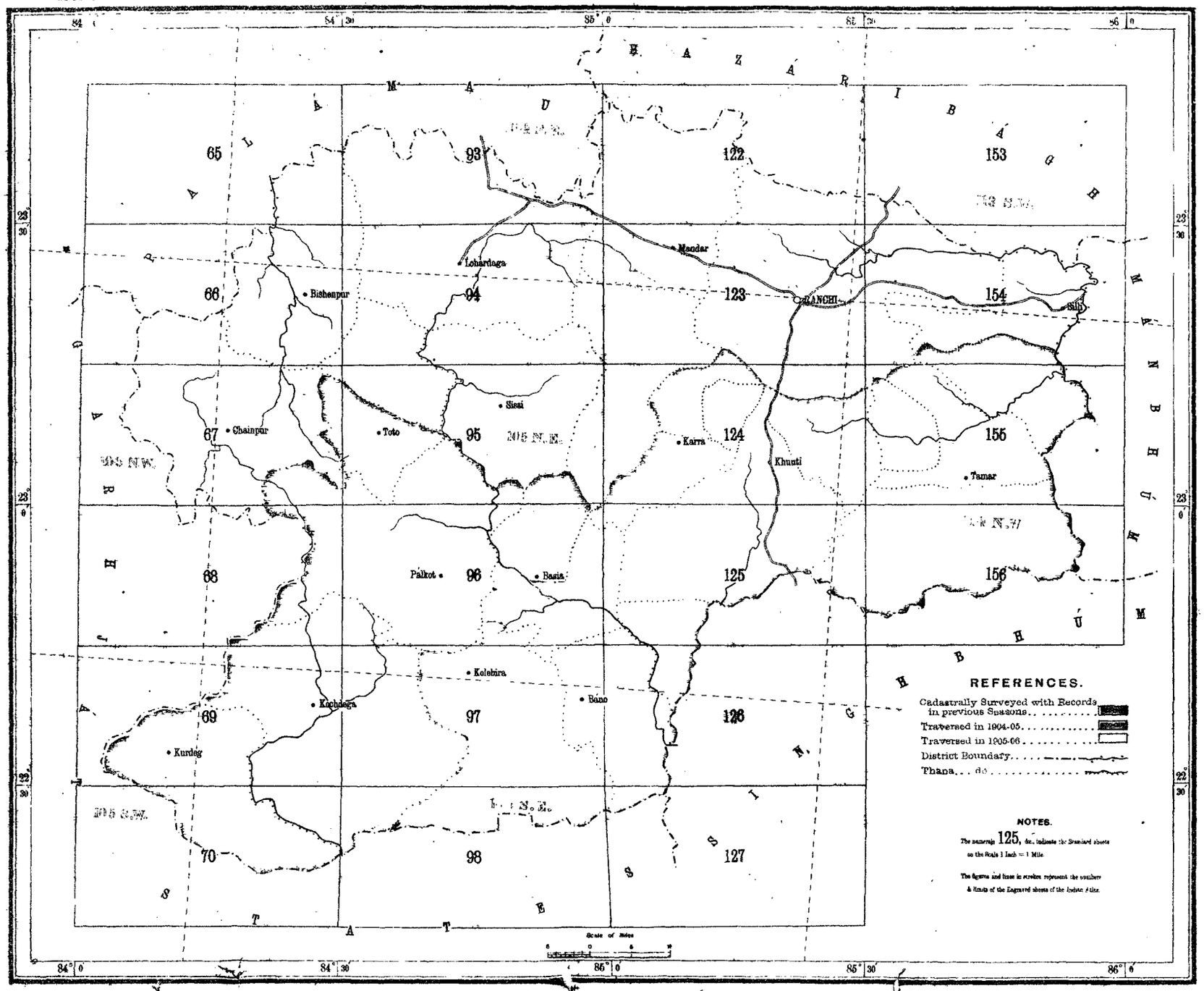
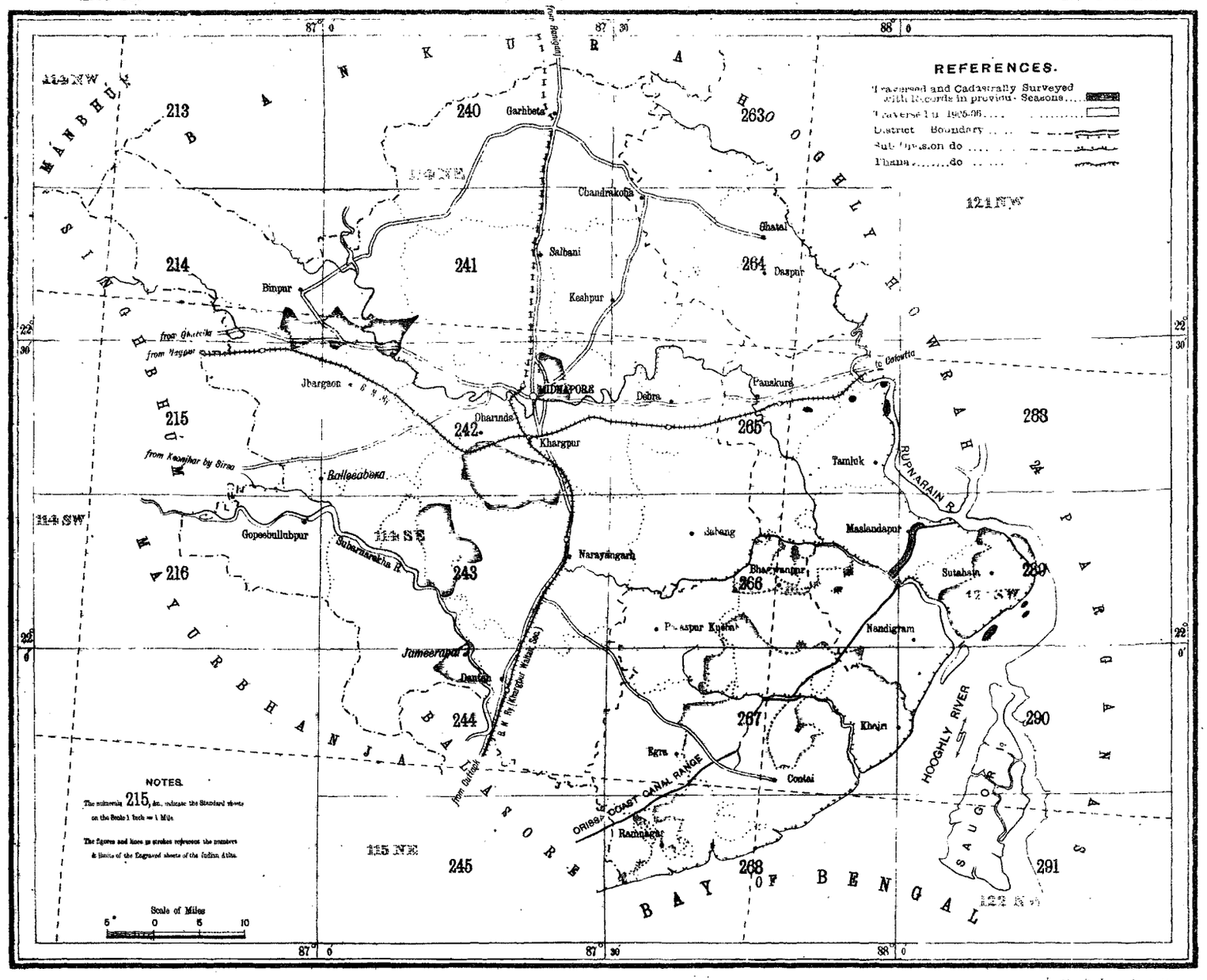


Photo. S. I. O., Calcutta.

BENGAL SURVEY.

1905-06. INDEX TO THE CADASTRAL SURVEY IN DISTRICT MIDNAPORE. No. 5 PARTY.



No. 256 E. Bengal—Aug. 06—525

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT SINGHBHUM.

1905-06.

No. 5 PARTY.

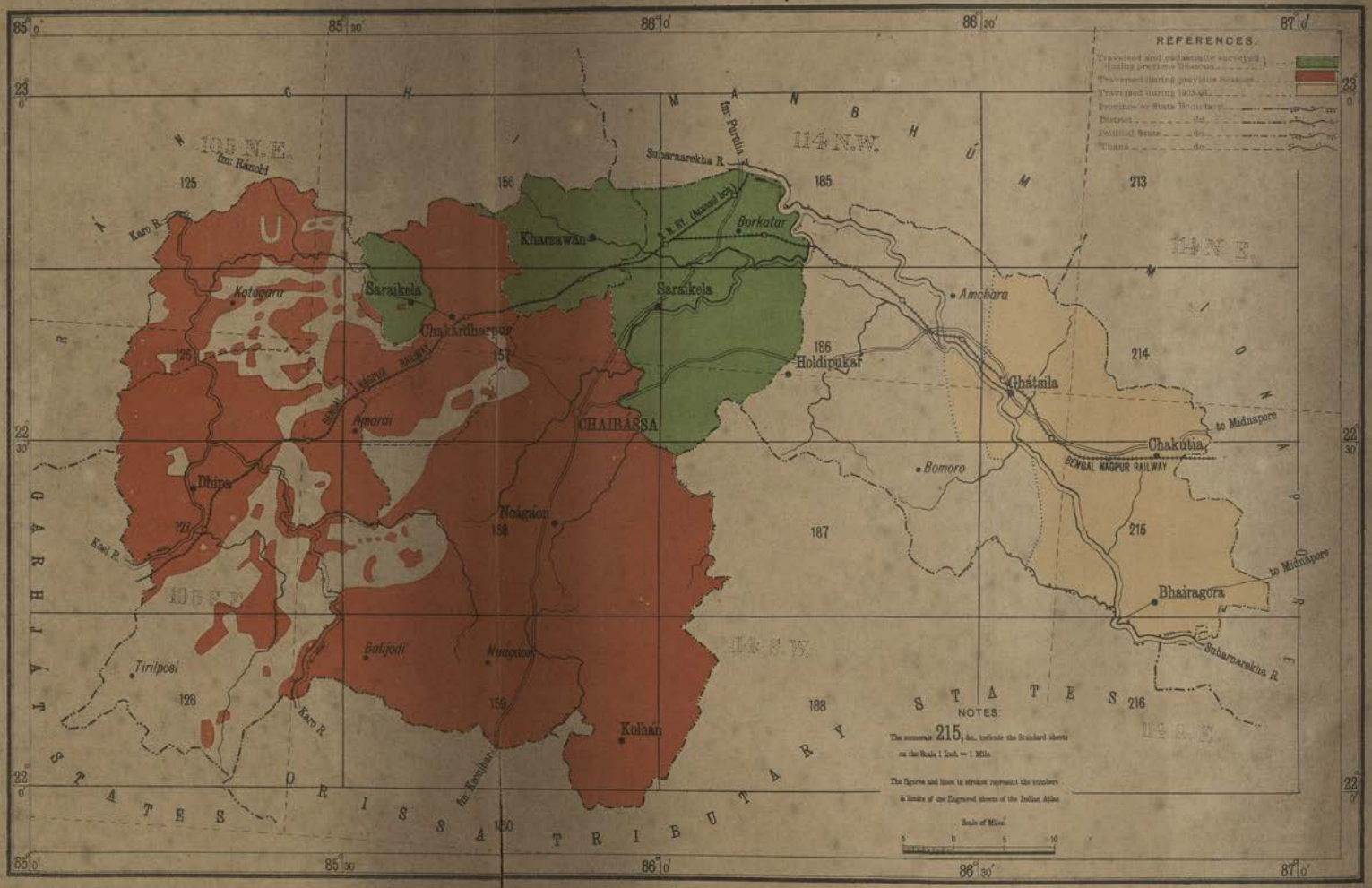


Photo. S. J. O., Calcutta

District Ranchi.

Traverse Survey.

43. During the year an area of 873 square miles has been traversed in thanas Chainpur, Bishunpur and Ghagra.

44. The angular work was checked by 108 azimuths, which give a mean magnetic variation of 1°09′ east. Connections have been made to five Great Trigonometrical stations.

45. About half the area traversed consists of high hills covered with dense jungle, which necessitated the constant use of the subtense bar and required a lot of line-clearing.

46. There were 14,471 theodolite stations, which were marked by 10,154 stones, 727 cylinders and 2,197 pegs, the remaining 1,393 points being marked by broad arrow marks cut on the rocks. The stones used in this survey are all local, the trijunction mark stones being distinguished by a circle and dot from other points which are marked by a broad arrow.

47. As usual in this district, the demarcation was found to be absolutely wanting and the surveyors, guided to a certain extent by the list of villages supplied by the Deputy Commissioner, had to traverse village boundaries as pointed out.

48. All the computations and plots are complete.

District Midnapore.

Traverse Survey.

49. Parganas Nayabasan and Rohini, amounting to an area of 187 square miles were traversed during the season.

50. There were 44 azimuths which gave a mean magnetic variation of 1° 04′ east. One Great Trigonometrical station was connected with.

51. There are 4,413 new theodolite stations, which have been marked by 2,385 stones, 1,802 cylinders, and 215 cuts on rocks. Stones of the Bihar pattern were used for trijunctions and the peripheries of both blocks traversed have been permanently marked in the same manner as described for Singhbhum.

52. The demarcation was very bad and the inhabitants obstructive. Several reports had to be made to the Collector and Settlement Officer.

The computation and plots are complete.

District Sonthal Parganas.

Traverse Survey.

53. In 1901-02-03 the area surveyed by Mr. Craven was traversed in skeleton with a view to connecting trijunctions only. Since then, a resettlement was decided on, and consequently a traverse survey in full detail was required. The area of 797 square miles traversed during the season is comprised in 9 scattered blocks and is known as Mr. Craven's first area.

54. There are 13,590 theodolite stations which have been marked by 9,854 stones, 2,002 cylinders, 1,489 pegs and 245 marks cut on rocks *in situ*. The stones used for trijunction points in this survey are of the Bihar pattern, the stones used for intermediate points being local and marked as in Ranchi.

55. There were 36 observations for azimuth (more were not necessary as the main circuits had been surveyed in former years) which give a mean magnetic variation of 1° 13′ east.

56. The demarcation was fair and the surveyors were also supplied with plots of the former trijunction survey.

The computations and plots are complete.

District Singhbhum.

Traverse Survey.

57. During the year the traverse survey of Dalbhum was commenced and an area of 573 square miles, being approximately half the area of the estate, has been traversed.

58. The 141 azimuths observed give a mean magnetic variation of 1° 08′ east. Four Great Trigonometrical stations were connected to.

59. The greater part of the country surveyed is undulating and about one-fifth of the entire area is hilly and jungly.

60. There were 16,365 theodolite stations which were marked by 12,539 stones, 1,909 cylinders and 1,204 pegs, the remaining 713 points being marked by cuts on the rocks *in situ*. The same nature of marks were used in this survey as have been used in Ranchi, except that along the district boundary, trijunctions have been marked by imported stones, similar to those used in Bihar and the stations immediately adjoining trijunctions have been marked by galvanized iron cylinders. This permanent and distinctive marking has been adopted with a view to allow of easy connections when adjoining districts come under survey.

61. The demarcation is reported to have been indifferent. The computations and plots are complete.

District Khulna.

Traverse Survey.

62. The operations in this district was confined to the Dehi Bhadra Estate, the plots of which were required during the same season for cadastral survey by the Settlement Department. The area surveyed is 106 square miles.

63. There are 2,255 theodolite stations, marked by 279 stones, 49 galvanized iron cylinders and 1,927 pegs. The periphery of the tract has been permanently marked so as to allow of easy connections when the remainder of the district comes under survey.

64. There were 29 observations for azimuths, and the mean magnetic variation is 1° 15′ east.

65. The country is low-lying and swampy and intersected with small *khals* or tidal creeks. The computations are all complete, and the plots have been sent to the Settlement Office.

District 24-Parganas—Sundarbans.

Traverse Survey.

66. The survey of the southern and uncleared portions of the Sundarbans was commenced during the year under report. The area traversed was 1,050 square miles and consisted of 456 squares miles, which had been marked off into 20 lots by the Settlement officer for future colonization purposes, and 594 square miles of forests, which have been traversed in 34 blocks.

67. There are 3,571 new theodolite stations, marked by 393 galvanized iron cylinders, 294 trunks of trees cut off at suitable heights, and 2,884 pegs. Cross-sticks, painted white, were affixed to adjoining trees so as to enable the detail surveyors to locate the traverse stations.

68. The angular work has been checked by 87 observations for azimuths to stars and to the sun. Observations to the sun had to be resorted to, as it was dangerous for men to land at night. The mean magnetic variation is 1° 13′ east.

69. The whole area traversed is an intricate net-work of rivers and tidal creeks, covered with forest and dense impenetrable jungle. The zig-zag system of traversing with the subtense bar, described in paragraph 62 of last year's report, was continued, and proved very satisfactory.

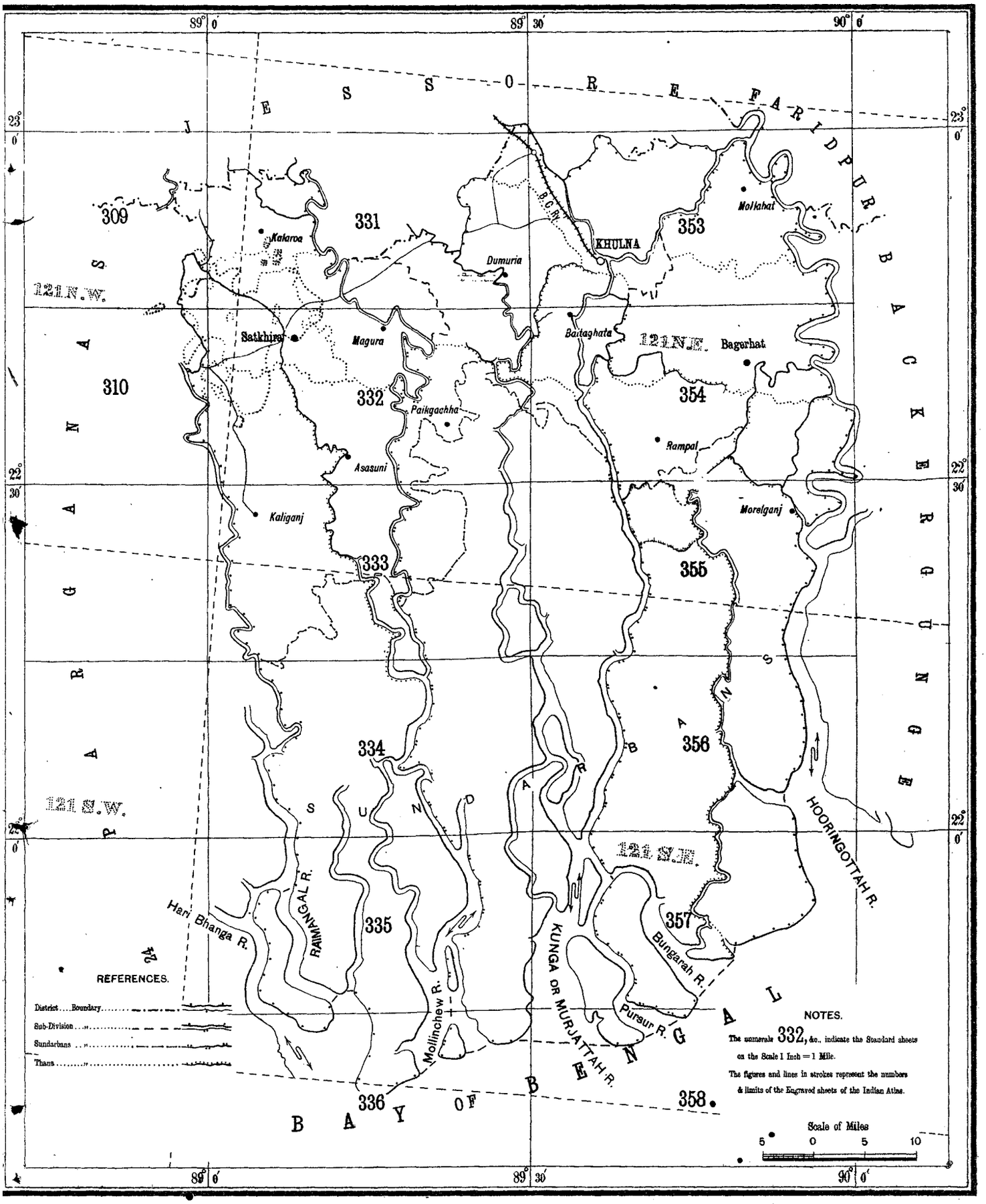
70. No connections with Great Trigonometrical stations were possible, as there are no stations near the area traversed, but next season connections will be made with the Hooghly River series.

71. The establishment was ordered to assemble at Canning Town on the 20th October 1905. Out of 398 *khalasies* recruited from Hazaribagh, 366 absconded in a body on the 25th October. Arrangements had then to be made for recruiting more men and eventually sufficient men were obtained from Gonda and Arrah and field-work was in full swing by 1st January.

72. All through the season great difficulty was experienced in inducing the menial establishment to remain. Eighty country boats were hired to

BENGAL SURVEY.

1905-06. . INDEX TO THE TRAVERSE AND TOPO SURVEY IN DISTRICT KHULNA. No. 6 PARTY.



No 368, Bengal—Nov 06.—525.

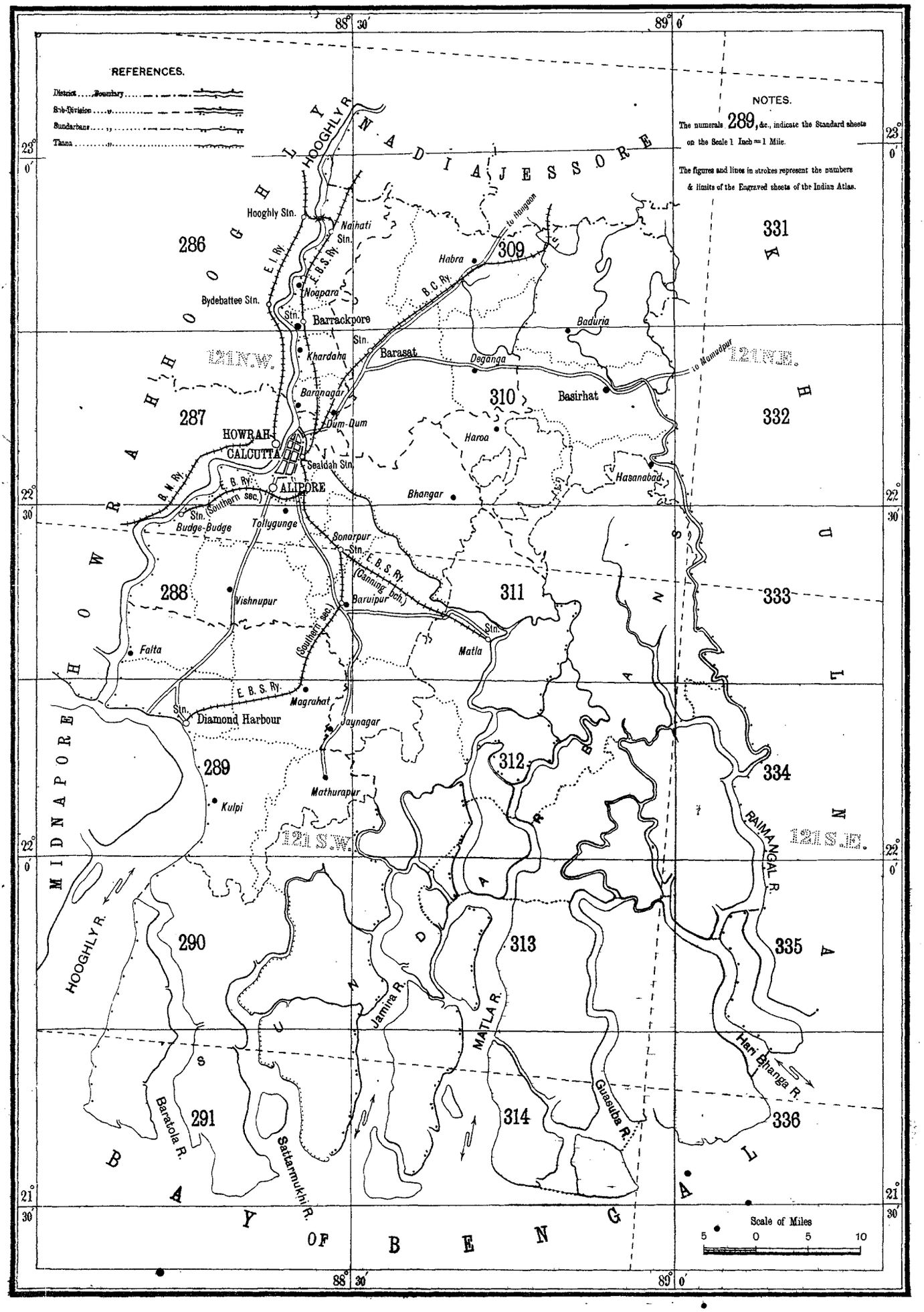
Cadastrally Surveyed in Season 1905-06.....

Traversed in Season 1905-06.....

Photo. S. I. O., Calcutta.

BENGAL SURVEY.

1905-06. **INDEX TO THE TRAVERSE AND TOPO SURVEY IN DISTRICT 24 PARGANAS. No. 6 PARTY.**



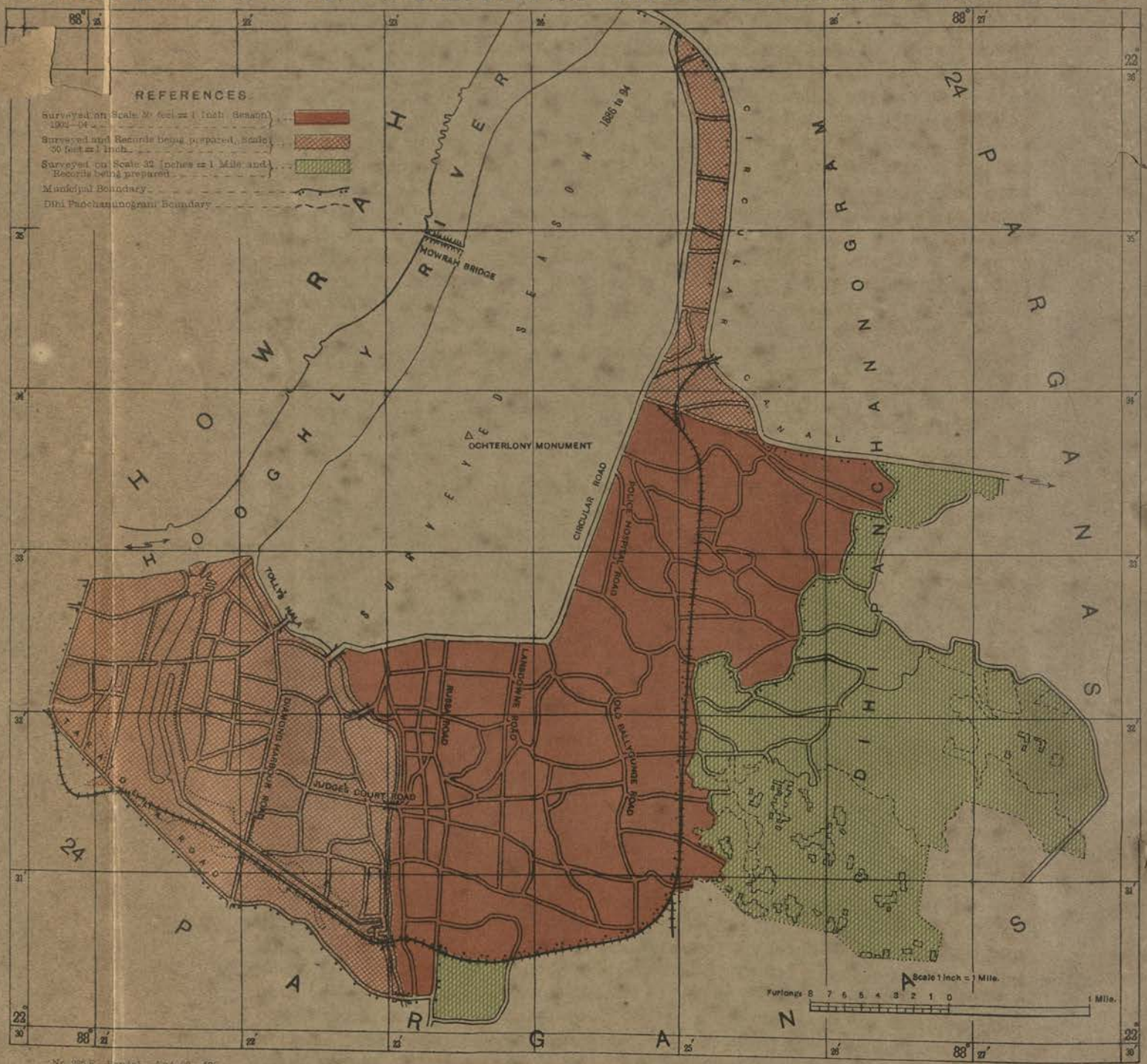
No 358, Bengal.—Nov 06.—525.

Traversed and Surveyed on 4 Inch = 1 Mile Scale in 1905-06.....

Do.....do.....2 Inch = 1 Mile Scale....do.....

Photo. S. I. O., Calcutta.

INDEX TO THE SURVEY
OF
THE ADDED AREA TO THE TOWN OF CALCUTTA AND PORTION OF DIHI PANCHANNOGRAM 1905-06



No. 235 E. Bengal—Aug. 06—525

Photo. S. I. O. Calcutta

accommodate the traverse and topographical surveyors and their squads, and throughout the season a steam launch and barge were employed in taking out fresh water and supplies from Canning Town, as absolutely nothing was obtainable in the tract under survey. A Hospital Assistant with medical stores accompanied the steamer.

73. The difficulties and discomforts experienced in surveying this sort of country were noted in paragraph 63 of last year's report.

74. The health of the establishment was bad, principally cases of malarial fever and dysentry. There were eleven deaths during the season of which six were due to cholera, four to dysentry and one man was carried off by a tiger.

Topographical Survey.

75. The whole of the 1,050 square miles traversed was also topographically surveyed. The 20 lots marked off by the settlement officer, covering 456 square miles (of this 104 is water area), were surveyed in the scale of 4 inches to the mile and the balance of 594 square miles on the 2-inch scale. There are 43 sheets in the former area and 17 in the latter.

76. Owing to the rapidity with which the jungle grows in these parts and the consequent danger of losing the traverse stations, it was necessary to have the topographical work in progress practically with the traverse. In many cases the detail surveyor had to survey streams and creeks on the plane-table section by means of the sight vane or make field books by the prismatic compass and chain. In all such cases the work was carefully fitted on in office and theodolite traverses were run for the purpose.

77. In addition to numerous resurveys of blocks, 473 linear miles of test survey were run and the running of theodolite traverses along details already mapped in the plane table sections, was in itself a very severe test. All the work, both 4-inch and 2-inch, has proved to be excellent.

PART III.—REPORTS ON MISCELLANEOUS SURVEYS.

CALCUTTA SUBURBS SURVEY.

78. The field-work in connection with the 8,513 acres, known as the added area of Calcutta, was completed during last season.

79. During the year under report, the only items of field-work accomplished were (*a*) revision of portions of the survey of Calcutta which fell into sheets containing the added area also, (*b*) traverse of 1,443 acres outside municipal limits, (*c*) skeleton survey on 50-foot scale of the foregoing 1,443 acres, and (*d*) detail survey on 32-inch scale of detached land.

80. *As regards* (*a*).—Blue prints of 40 sheets common to the Calcutta City Survey and the present survey were obtained and the old survey brought up to date, so that the sheets of the present survey may be completely up to date. This revision showed great changes and a thorough revision of the Calcutta survey sheets is clearly indicated.

81. *As regards* (*b*) *and* (*c*).—In order to ascertain where the detached lands of the Panchanagram Estate lay 1,443 acres had to be traversed. This amount of traversing would have been unnecessary if any body could have pointed out these lands, but as there are no old maps or documents to refer to and the Khas Mahal Surveyor could not locate the holdings, nothing remained but to make a skeleton survey and rough record.

82. *As regards* (*d*).—By means of the skeleton survey and rough record just referred to, holdings were traced, owners summoned to attend and demarcate, and eventually 227 acres of scattered holdings were surveyed in detail on the 32 inch=1 mile scale, and 40 acres on the scale of 50 feet to the inch.

83. The demarcation of municipal holdings has now been practically completed, but the demarcation of revenue holdings is still far from complete.

84. The difficulties experienced in ascertaining the names of present landlords have frequently been pointed out. An attempt to utilize old maps

in locating holdings has not proved successful, as the maps, prepared by a Deputy Collector of several subdivisions outside the municipality, show boundaries which do not agree at all with the boundaries as poited out by the present holders and as mapped in the present survey. In fact the two surveys bear no resemblance to one another in this respect.

85. In another subdivision there are maps available of no less than four surveys, including the present survey. None of these agree in the delineation of holdings. This points to the advisability of permanently marking the boundaries of holdings.

86. Out of the 393 fair maps, 253 have now been drawn in skeleton, of which 90 have been completed in boundaries and can be published as soon as the final examination by a European officer can be undertaken. The completion of the remaining maps depends on the progress made with the settlement of disputes and attestation.

87. A start has been made in the preparation of the maps required for revenue purposes.

88. It has been proposed to bring the survey of Calcutta proper up to date and to maintain an establishmeut to deal with all changes as they occur, thereby ensuring correct and up-to-date maps of the whole of Calcutta. A scheme is under preparation and will be submitted as soon as possible.

Patna Division Diara Survey.

89. In paragraph 111 of last year's report, it was stated that permanent marks would be embedded at selected points in the *diara* with a view to providing stations on which a yearly revision survey by a non-professional agency might be based, and the work has been undertaken during the year under report. An area of 54 square miles was selected, and in this tract 288 marks were laid down. Of these 288, marks 99, which were actually on islands and high sand banks, consisted of heavy 10-foot scantlings with cross feet, arranged, so as to give the mark when buried about 5 feet deep, sufficient purchase to withstand considerable water pressure.

90. Very few of the old stations along the edges of the *diara* tract could be found, which proves that the existing permanently marked *diara* lines cannot be drawn closer together with safety, but the examination of the marks actually inside the *diara* tract which will be undertaken during the coming field season will show whether or not anything can be done towards providing sufficient permanent marks in the middle of the *diara*. The work of the season was mapped on one sheet on the 2-inch to the mile scale.

Darjeeling Nepal Boundary.

91. Mr. O'Donell, Extra Assistant Superintendent, was deputed to relay this boundary which containd several disputes and lay chiefly along the Mechi river. One hundred and twenty points at the main bends of the 51 linear miles of boundary have been temporarily marked. Of these 55, which are on high ground, will be replaced by permanent marks to be put down by the local officials and the remainder, which fall into the river bed are indicated by temporary reference marks on adjoining safe ground. These temporary reference marks are also to be replaced by permanent marks by the local officials.

92. The traverse work was connected to one Great Trignometrical station. Mr. O'Donell's maps have been sent to the Deputy Commissioner of Darjeeling. The computation which are complete are being retained in the Bihar Survey party for the present.

Patna District.

93. The two villages named Sadikpur and Saran, reported to have been traversed in paragraph 108 of last year's report have been cadastrally surveyed with a record-of-rights during the year under report.

Purnea District—Purnea Municipality.

94. The urban area, amounting to 5·4 square miles of the Purnea Municipality which does not fall into the course of the ordinary operation under the

Bengal Tenancy Act, has been topographically surveyed during the year, in order not to leave a gap in the new standard maps.

The area was plotted on two sheets and surveyed on the scale of 2 inches to the mile.

Bhagalpur-Traverse of Baneli Raj Villages.

95. In the course of the recent survey operation in thana Bangaon, the boundary comparisons made with the maps of some Baneli Raj villages, which were omitted from the professional survey operations, showed such large differences that it was necessary to traverse the boundary of these villages to ascertain exactly where the error lay. This traverse which has been carried out during the season under report, shows that there was an error of 9 chains in the Baneli Raj survey and that there must have been extensive falsification in the survey of the villages concerned.

Nepal cum *Purnea and Bhagalpur boundary.*

96. For several years past annual reports have been received from the District officers concerned, that certain pillars and posts on the Nepal frontier have been carried away by the Kosi river. These points have been frequently fixed and refixed by the Bihar Survey party, but it has been found, that even reference pillars on selected ground have been carried away. During the year under report another temporary demarcation has been undertaken and 20 selected points marked by stout "Sal" wood poles. These poles will be examined early next season, but if they have been swept away it is feared that nothing satisfactory can be done to mark the boundary permanently in this tract.

PART IV.—REPORT ON THE BENGAL DRAWING OFFICE.

97. Mr. G. W. Archer was in charge from 1st to 15th October 1905 when Mr. L. F. Berkeley took over charge on transfer from the United Provinces, and has retained charge throughout the year.

98. It was indicated in last year's report that the rapid increase of work, especially in the reproduction of village maps section, pointed to the necessity of increasing the accommodation. Owing to this increase, during the year, a new grainer's shed has been erected, the accommodation for photo work has been doubled by building another vandyke room and ten new hand-presses, with all the necessary additional plant have been purchased. Two portable iron sheds transferred from No. 6 Party from Dacca have also been erected at a small cost to supply the accommodation for extra establishment engaged in dealing with the correction, after comparison with the settlement traces, of two vandyked copies of the map of each village in the Orissa Division.

99. The work of the office has been divided, during the year, into seven main sections:—

(*a*) General or Controlling Section.
(*b*) Standard Mapping Section, including the preparation of district maps.
(*c*) Traverse Chart Section.
(*d*) Thana and Trijunction Marks Map Section.
(*e*) Reproduction of Village Maps Section.
(*f*) Badar Section.
(*g*) Record Section.

Standard Mapping Section.

100. It was stated in last year's report that the districts of Darbhanga, Monghyr and Bhagalpur, north of the Ganges river, are comprised in 18 standard sheets. This needs correction as they are comprised in 24 standard sheets of four sections each. Taking into account the rejections mentioned in paragraph 121 of last year's report, this section has dealt with 18½ of such standard sheets. Seven of these have been completed in the old style of four

sections each and sent for publication during the year and two, containing the published portions of north Monghyr, after having the Bhagalpur District added on to them, will also shortly be sent for publication in the old style. The remainder are being completed in the new style and comprise 19 standard sheets of two sections each. Six of these are completed and will be sent for publication as soon as the orders for foot-notes for these sheets are received. The remaining 13 were started during the year to enable the section, not only to commence the district map of Bhagalpur as soon as possible, but also to facilitate the preparation of thana and trijunction mark maps. For a similar reason ten sheets of district Purnea have also been commenced during the year.

101. The district map of Puri which was practically completed last year has been completed and published during the year. The district map of Champaran, after the incorporation of Colonel Tanner's work, and completion in all other respects has been sent for publication during the year. The District map of Darbhanga is nearing completion and it is hoped, will be submitted for publication by the end of October.

102. This section has also prepared during the year the Index maps of districts Dacca, 24-Parganas and Khulna, and revised the Index maps of districts Sonthal Parganas and Monghyr.

103. It has also done the complete colouring, for the head-quarters office, of two copies of two standard sheets and two copies of the district maps of Puri and Cuttack, and the colouring of fiscal limits only, on 12 unpublished proofs of standard sheets and two unpublished proofs of the district maps of Puri and Champaran. In addition the final examination and correction of ten unpublished proofs of ten standard sheets and one unpublished proof of a district map have been carried out. Small corrections and additions have also been inserted on 12 published proofs of 12 standard sheets.

104. It has also prepared, out of office hours, traces for reproduction, from originals supplied by the Special officer for revision of Boundary Commissioner's lists in Bengal, of 112 thana maps of 11 districts.

Traverse Chart Section.

105. This section has been separated from the Standard Mapping Section and consists now of three draftsmen and three computers entertained during the year.

106. Fifty-one traverse charts of the Orissa Division have been put in hand on scale of 1″=1 mile ; four charts with co-ordinate values on them are now complete. Eighteen charts in addition to these have been completed in outlining, numbering, headings and borders. Co-ordinate values and foot-notes now only remain to be entered on them. These will be completed in every respect before any further work in the remaining 29 charts which are completely outlined with borders, is undertaken.

107. After completion of the traverse charts of the Orissa Division, those of Bihar will be started on the half-inch scale. The computation of co-ordinate values of 3,230 villages of the Orissa Division and of 5,410 villages of Bihar has been done during the year.

Trijunction Mark and Thana Mapping Section.

108. This section has been strengthened by the entertainment of one new draftsman and consists now of eight draftsmen.

109. During the year this section has dealt with the preparation and completion of the trijunction mark maps of 77 thanas of districts Cuttack, Puri, Balasore, Champaran, Saran, Muzaffarpur, Shahabad, Gaya and Patna. Sixty-eight of these have been reproduced and 922 copies supplied to Collectors in accordance with the number of copies required of each. Before reproduction it was found necessary to trace 62 of these and six thanas were reproduced direct. Of the remaining trijunction mark maps of nine thanas, two have been traced for reproduction and six will be reproduced direct in October and one later. Districts Puri, Balasore, Champaran, Saran, Muzaffarpur and Shahabad are now complete in this respect.

The trijunction mark maps of three thanas of districts Bhagalpur and Monghyr have also been commenced and the trijunction mark maps of

four thanas of Saraikela and Kharsawan, of district Singhbhum, prepared by the Settlement Officer are also in process of examination, correction and completion prior to reproduction.

During the year the section has also dealt with and completed fair thana maps of one thana of district Cuttack, four thanas of district Darbhanga, which complete the district, and three thanas of district Monghyr. All of these have been reproduced and 200 copies of each supplied.

110. Good progress had been made in the tracing from standard sheets of the portions of thanas Islampur, Kishanganj, Bahadurganj and Kasba Amur which come into the Surjapur pargana of district Purnea to enable No. 4 Party to complete the thana maps of these thanas in connection with the later survey of 1904-05.

111. The office has also prepared fair thana maps of the four thanas of Saraikela and Kharsawan, district Singhbhum, and of six thanas of district Bhagalpur from originals supplied by the Settlement Officer and Director of Land Records, respectively. Those of Bhagalpur have been reproduced and 200 copies of each supplied.

112. Quite apart from its programme the office has also prepared traces for reproduction, out of office hours, from originals supplied by the special officer for the revision of Boundary Commissioners' lists, of 112 thana maps of 11 districts. These have also all been reproduced and 200 copies of each supplied to the Special officer.

Reproduction of Village Maps Section.

113. The anticipations of a very large increase of work in this section, referred to in paragraph 135 of last year's report have been justified. During the year under report 462,961 copies of maps have been produced and despatched.

114. In addition to its ordinary work of making traces for reproduction and of direct reproduction of maps, this section has undertaken the following items of work during the current season: (*a*) The touching up of 953 sheets of district Purnea of the survey of season 1903-04, prior to reproduction. (*b*) The comparison of settlement traces of districts Champaran, Darbhanga and Muzaffarpur against original maps. After the comparison of the traces of 840 villages of districts Champaran and Darbhanga, this work was put a stop to by order of the Director of Land Records, as the original maps were found to be more up to date and complete than the settlement traces, and the settlement traces were all returned. (*c*) The correction of two vandyked copies of the original maps of villages of district Balasore according to settlement traces, 6,520 vandyked copies of 2,904 villages or 3,060 setttement traces have been received during the year out of which 3086 copies of 1354 villages have been corrected, examined and despatched. The remainder are in hand and will shortly be despatched. Of a few villages the vandyked copies were received incomplete. The Collector has been addressed with regard to these. This work which was commenced only during September has to be continued for the whole of the Orisssa Division during the next year. (*d*) The correction of old original paper traces, before reproduction, according to the revised settlement trace maps of 144 villages on 157 sheets of the Banki Government Estate, district Cuttack, which were supplied for reproduction by the Collector, but which could not be reproduced direct owing to the colours on them. These were originally traced on 211 paper traces of which 174 have been corrected and examined and 3 retraced, 22 have been reproduced and 660 copies of them supplied to the Collector. Discrepancies have been found at the time of correction in 71 villages which have been referred to the Collector and only 13 have as yet been received back. The traces of 22 villages on 24 sheets had to be returned for rectification as on comparison with originals they were found to be out of proportion. These also have not yet been received back. As soon as all these are received the reproductions will be pushed on with. The additions and corrections made at the time of revision survey on the settlement traces are so very numerous that it is not advisable to correct the original maps according to them, instead of this a copy of the reproduction of each corrected

paper trace will be filed with its original. (*e*) The production either within or out of office hours on contract, of 200 copies of each of the thana jurisdiction maps for Special officer for revision of Boundary Commissioner's lists, of 396 thanas of 30 districts, also of 1,476 copies of 105 sheets of the Calcutta Suburbs Survey.

115. With reference to the ordinary programme and work of the section the remaining four paper traces of district Saran have been vandyked and the remaining 5,010 copies despatched to Collector.

116. Of district Muzaffarpur the remaining 11 sheets have been traced on 11 paper traces, all of which have been examined. The remaining 1,232 traces have been vandyked, after receipt back recently of the badars of 853 villages and after the re-examination, which was found necessary of the traces that remained to be vandyked last year. It was found necessary also to make a cursory re-examination and correct, where necessary, the copies that were printed, but remained for despatch last year. Hence 3,976 copies have only been despatched during the season. The despatch of the remaining 27,434 is now in progress.

117. In district Champaran the remaining five sheets have been traced on five paper traces and examined. The remaining 3,319 paper traces have been vandyked and 12,910 copies despatched. In this district also it was found necessary to do the re-examination and correction, where necessary, of such paper traces that were not vandyked last year, and of the reproduced copies that were not despatched, hence the delay in despatches. However, the despatch of the remaining 39,910 copies will be made early next year. The discrepancies found in 310 villages were sent to Settlement Officer for reconciliation and these have all been recived back.

118. In Darbhanga 2,010 sheets have been traced on 538 paper traces making a total to date of 9,071 sheets traced on 7,371 paper traces and leaving a balance of only 21 sheets to be traced. Six thousand one hundred and fifty-five paper traces have been examined, making a total to date of 7,311 examined. Six thousand six hundred and fifty three of these have been vandyked and printed during the year, and 37,130 copies have been despatched. Dispatches are being made weekly as the Collector has asked for them to be supplied as quickly as possible. In this district also it was found necessary to make a cursory re-examination of the paper traces prepared last year. Discrepancies found in 683 villages have been sent during the year to Settlement Officer for reconciliation and those of 397 villages have been received back reconciled.

119. North Monghyr has been started within the year. There are 3,895 sheets for tracing out of which 3,350 have been traced on 2,960 paper traces. Two thousand seven hundred and fourty three have been examined and 2,370 vandyked. Owing to the despatches of other districts being more urgent, it has not been possible so far to despatch any of the repoductions of this district. Discrepancies found in 32 villages have so far been sent for reconciliation and 21 have been received back.

120. Of the Purnea work of 1903-04; of 2,264 sheets, 298 thick sheets have been traced on 297 paper traces all of which have been examined. One thousand nine hundred and eighty-nine paper traces and sheets have been vandyked and 223,240 copies sent to the Settlement Officer in accordance with the statements supplied by him of the number of copies of each sheet needed. Discrepancies found in 10 villages have been sent for reconciliation and three have been received back.

121. Of the work of North Bhagalpur 1,660 sheets have so far been traced on 1,625 paper traces and 634 examined. None have been vandyked as yet. The discrepancies found in three villages have only so far been sent for reconciliation and one has been received back.

122. Of Ranchi there were 644 sheets for tracing. These have been traced on 589 paper traces and all have been examined; 578 were vandyked and 6,412 copies supplied during the year. As there were discrepancies found in 58 villages, all of which, with the exception of two, have been received back, the remaining paper traces, with the exception of these two villages, will be vandyked early in October and copies supplied. In the Sonthal Parganas there will be about 15,200 paper traces in all for reproduction; of these 4,779

have so far been received and reproduced and 92,570 copies supplied to the Settlement Officer.

123. Every endeavour is being made to finish all the tracing that remains of Bihar and its examination as soon as possible, so as to get rid of the staff of tracers and examiners and thus reduce the overcrowding in the office.

124. In connection with the Programme of Reproduction to be done for attestation purposes, 774 sheets of Purnea and 643 sheets of Midnapore of the survey of 1904-05 have been reproduced and 3,130 copies supplied. There were 943 sheets of Purnea, 2,269 of Bhagalpur and 1,880 of Ranchi of the survey of 1905-06 for reproduction altogether, all of these have been reproduced and 13,021 copies altogether supplied.

125. This section has also reproduced one copy each of 155 sheets of 78 villages for the Executive Engineer, Champaran Division (Irrigation Branch). These have been mounted on cloth according to requirements and supplied.

Badar Section.

126. During the year the "badars" of 30 villages of Bihar, 43 of Midnapore and 7 of Ranchi have been received and corrected on original maps.

127. Headings and adjoining village names have been corrected according to the spelling given in Thana Lists on 5,486 sheets of Bihar. Saran was previously completed in this respect and Muzaffarpur, Champaran and Darbhanga are now complete. District Monghyr and Bhagalpur are in hand. Correct thana names and numbers have also been entered on the 4-inch sheets of 141 villages of district Bhagalpur.

128. Village names have been corrected and thana numbers entered of 3,882 villages of Bihar in traverse volumes and of 2,846 villages in field-books. The districts dealt with being Muzaffarpur, Champaran and Darbhanga.

129. Thana lists of 6,546 villages of Muzaffarpur, Champaran and Darbhanga have been completed and the columns showing main circuit, sub-circuit and village numbers have been filled up for 506 villages of Champaran.

130. This section has also had to undertake a good deal of work in addition to its ordinary work as follows:—

(*a*) Village names in headings and adjoining sheet numbers have been entered in 2,489 sheets of districts Ranchi and Revenue-Survey numbers in 2,136 sheets of districts Singhbhum and Midnapore which were received incomplete in these respects from field camps.

(*b*) It has also done a large amount of touching up for reproduction of the sheets of Eastern Bengal which will be noticed in the report for that province.

(*c*) Two copies each of the reproductions of 54 villages of district Puri were also corrected experimentally.

Map Record Section.

131. This section has received during the year 15,269 original sheets of Bengal and Eastern Bengal, making a total now of 96,861 sheets in this office. Seventy four thousand nine hundred and twenty nine of these have been racked the remainder being temporarily with the Standard Mapping, Reproduction and Badar sections, which have separate racks for their safe custody. Thanawar lists were made out for 51,529 sheets up to the end of last season and not for 55,357 as mentioned in last year's report. Lists either Thanawar or Parganawar have been made out for 12,904 sheets during the year making a total to date of 64,433 sheets. Lists of the balance are either in process of preparation or are awaiting the receipt of Thana Lists from camps or District officers.

132. Serial numbers have been pasted on to 38,147 sheets during the year, making a total to date of 51,582. This work is making as steady and as rapid progress as is possible, 4,314 sheets with edges broken have also been repaired with cloth. Twenty-one thousand five hundred and twenty-two paper traces with lists complete of the Orissa Division and Chittagong are now stored in this section. Those of Bihar are also now being gradually transferred to this section for record.

CHAPTER III.

PART I:—TOURS OF SUPERINTENDENT PROVINCIAL SURVEYS.

133. I have been in the field and on tour for 226 day's. I have inspected each section several times in the field and again, at least, once during the recess season. During both field and recess I visited the Cadastral office of the Ranchi Survey which is now under the Settlement Department and advised as to the drawing of the map for reproduction and various other matters regarding which the Director of Land Records desired to consult me.

PART II—SERVICES OF OFFICERS.

134. Among the Executive Officers Captain F. C. Hirst and Mr. A. W. Smart in charge of Nos. 4 and 6 Parties, respectively, have again done exceptionally good work.

Mr. L. F. Berkeley, in charge of the Bengal Drawing Officer has done excellent work.

Mr. T. W. Babonau who was in charge of No. 5 Party for half the year has also worked satisfactorily.

Mr. R. B. Smart, in charge of the Calcutta Suburbs Survey, has continued to work well.

135. Of the officers in charge of camps the following deserve special mention for exceptionally good and hard work; Messrs. C. S. Kraal, N. Bedford, J. H. Murphy, E. G. Hardinge and C. A. O'Donel.

136. Of the Assistants the following are specially mentioned: Babu Nilmoni Chatterji and Messrs. S. F. Norman, O. E. C. Judd, P. F. Delaney and H. A. Hardless.

137. The remaining Assistants and Supervisors have all worked well, and given valuable assistance to the officers in charge of their sections.

138. Two very good officers, viz., Messrs. C. S. Gasper and G. Archer have died during the year under report.

I have the honour to be

SIR,

Your most obedient servant,

R. T. CRICHTON, MAJOR, I.A.,

Superintendent of Provincial Surveys in Bengal.

APPENDIX I—PART A.

Summary of the outturn of work of the Survey Parties in Bengal for 1905-1906.

DISTRICT.	TRAVERSING.					CADASTRAL SURVEY.				RECORD-WRITING.		TOPO-GRAPHICAL SURVEY.
	Number of villages.	Linear miles of chaining.	Number of stations at which the theodolite was set up.	Number of azimuths.	Number of sub-traverses.	Villages.	Fields.	Linear miles of test survey.	Sheets.	Villages.	Fields.	Villages.
1	2	3	4	5	6	7	8	9	10	11	12	13
Private Estates.												
Bhagalpur	202	1,438	11,226	36	706	2,285	1,018,516	5,677	2,638	2,290	924,141	...
Purnea—Traverse for topographical ...	17	76	273	3	10	...	...	...	...	...	...	17
Ditto Ordinary	14	102	445	...	36	701	243,064	2,344	939	701	243,064	...
Monghyr	1,014	4,685	32,535	120	2,201	...	...	...	...	...	...	...
Ditto Traverse and traingulation for topographical.	(a)	(a)	(a)	(a)	(a)	...	...	...	...	...	...	...
Sonthal Parganas—Traverse for topographical.	5	37	103	...	10	...	...	...	...	...	...	5
Ditto Ordinary ...	1,460	2,519	17,492	36	494	...	...	...	...	...	...	...
Ranchi	402	2,476	16,855	108	754	...	...	...	...	...	...	...
Singhbhum (Dalbhum)	1,018	2,147	19,477	141	538	...	...	...	...	...	...	...
Midnapore	561	794	5,737	44	100	...	...	...	...	...	...	...
24-Parganas—Sundarbans ...	(b)54	1,100	3,711	87	47	...	...	...	...	...	...	54
Khulna	64	393	2,556	29	70	...	...	...	...	...	...	...
Miscellaneous.												
Patna Division Diara Survey ...	...	106	310	1	9	...	...	...	...	...	...	...
Darjeeling—Nepal boundary ...	(b)3	51	145	2	3	...	...	...	...	...	...	...
Patna District—Mauzas Sadikpur and Sarhan.	...	...	...	...	...	2	10,614	46	12	2	10,614	...
Bhagalpur—Baneli Raj villages ...	5	8	32	...	3	...	...	...	...	...	...	...
Nepal *cum* Purnea and Bhagalpur boundary.	...	5	16	...	2	...	...	...	...	...	...	...
Calcutta Suburbs Survey ...	...	44	275	...	...	...	(c)1,261	6	...	...	(c)1,261	...
Total ...	4,814	15,981	111,188	607	4,983	2,988	1,273,455	8,073	3,589	2,993	1,179,080	76

(a) Details not available at present.
(b) Blocks.
(c) Holdings.

R. T. CRICHTON, MAJOR, I.A.,
Superintendent of Provincial Surveys in Bengal

APPENDIX I—PART B.

Statement of Outturn and Cost-rates.

District and Estate.	Description of work.	Estimated area to be dealt with in square miles.	Year of inception of operations.	Area surveyed in square miles. During the year under report.	Area surveyed in square miles. Total including previous years.	Cost-rate per square mile. During the year under report.	Cost-rate per square mile. From beginning to end of the year under report.	Balance of area remaining to be surveyed.	Estimated cost of completing the area in column 9.	Estimated final cost rate per square mile.	Remarks. [Explanation of unusually high expenditure.]
1	2	3	4	5	6	7	8	9	10	11	12
Private Estates.						Rs.	Rs.	Rs.	Rs.	Rs.	
Bhagalpur	Traverse ...	3,448	1901	363	3,448	44·7	30·6	Nil	Nil	30·6	Intricate traversing. No less than 31 stations per square mile.
	Cadastral ...	3,448	1902	(a) 1,276	3,197	76·1	67·0	251	15,060	66·5	The rate of Rs. 134·7 per square mile is higher than that of last year owing to the average size of field being one-third of that of last year and also to reduction of the record-writing programme.
	Records ...	3,448	1902	(a) 1,108	3,008	58·6	60·4	440	26,400	61·8	The rate practically agrees with the rate given in the 24 years' programme.
Purnea	Traverse for topographical.	450	1903	33	450	20·0	10·5	Nil	N	10·5	This is for 16 inch work and cannot compare with last season's which was only 4 inch.
	Traverse ordinary	4,421	1900	37	4,421	33·8	30·2		Nil	30·2	Fair rate for small programme.
	Cadastral ...	3,732	1901	485	3,732	73·5	70·1	Nil	Nil	70·1	The rate of Rs. 119·2 per square mile is very good for fields averaging 0·78 of an acre.
	Records ...	3,732	1901	485	3,732	45·7	37·3	Nil	Nil	37·3	
	Topograpical ...	318	1903	23	318	10·0	14·9	Nil	Nil	14·9	Fair rate.
Monghyr	Traverse ...	1,974	1905	1,217	1,217	31·2	31·2	757	21,200	26·8	Good cost rate. The rate is even lower than shown here as the expenditure includes that of the 275 square miles of traverse and triangulation for which separate figures are not at present available.
	Traverse and triangulation.	275	1905	275	275	...	...	Nil	Nil	...	
Sonthal Parganas ...	Traverse for topographical.	22	1905	22	22	65·0	65·0	Nil	Nil	65·0	This rate means nothing as credit has not been taken for a considerable overlap survey in Malda.
	Traverse ordinary	1,621	1905	797	797	37·0	37·0	824	29,700	36·5	Fair rate considering scattered nature of programme.
	Topographical ...	22	1905	22	22	26·4	26·4	Nil	Nil	26·4	Includes overlap work.
Ranchi	Traverse ...	7,081	1901	873	4,798	37·6	34·1	2,283	68,500	32·8	Higher rate than last year owing to reduction of programme and more hilly nature of country Cost of moving the party from Singhbhum included.
Singhbhum (Dalbhum) ...	Do. ...	1,143	1905	573	573	36·9	36·9	570	20,000	36·0	Difficult country and not a full unit of programme.
Midnapore (Nayabasan) ...	Do. ...	187	1905	187	187	33·1	33·1	Nil	Nil	33·1	Fair rate for small programme.
24-Parganas-Sundarbans	Traverse ...	1,700	1905	1,050	1,050	50·4	50·4	650	42,000	55·3	Good rates considering nature of country and work.
	Topographical 4"	456	1905	456	456	43·3	43·3	Nil	Nil	43·3	
	Ditto 2"	1,244	1905	594	594	36·3	36·3	650	32,500	43·5	
Khulna (Dihi Bhadra) ...	Traverse ...	106	1905	106	106	48·1	48·1	Nil	Nl	48·1	Small detached programme.

(a) Includes 26 square miles of hilly ground.

APPENDIX I—PART B—*concluded.*

Statement of Outturn and Cost-rates—concluded.

DISTRICT AND ESTATE.	Description of work.	Estimated area to be dealt with in square miles.	Year of inception of operation.	AREA SURVEYED IN SQUARE MILES.		COST-RATE PER SQUARE MILE.		Balance of area remaining to be surveyed.	Estimated cost of completing the area in column 9.	Estimated final cost rate per square mile.	REMARKS. [Explanation of unusually high expenditure.]
				During the year under report.	Total including previous year.	During the year under report.	From beginning to end of the year under report.				
1	2	3	4	5	6	7	8	9	10	11	12
Miscellaneous.						Rs.	Rs.	Rs.	Rs.	Rs.	
Patna Division diara ...	Traverse ...	54	1905	54	54	...	...	Nil	Nil	...	
Patna District mauza Sadikpur and Sarhan.	Cadastral ...	8	1905	8	8	...	...	Nil	Nil	...	
	Records ...	8	1905	8	8	...	...	Nil	Nil	...	
Bhagalpur (Baneli) ...	Traverse ...	2	1905	2	2	...	...	Nil	Nil	...	
Calcutta Suburbs Survey	Do. ...	18	1903	2	18	...	...	Nil	Nil	...	Although no more money will be required for field work, there is a lot of work remaining in connection with maps and reconciliation of holdings, etc., and therefore no cost-rates can be given at present.
	Cadastral 32" ...	3	1903	(*a*)	3		...	Nil			
	Records ...	3	1903	(*a*)	3	...	...	Nil			
	Cadastral 50 ft.	15	1903	(*b*)	15	...	...	Nil			
	Records ...	15	1903	(*b*)	15	...	...	Nil			
Total and average of columns 7, 8 and 11.	Traverse ...	22,502	...	5,591	17,418	39·1	32·9	5,084	...		
	Cadastral ...	7,206	...	1,769	6,955	75·3	68·7	251	...		
	Records ...	7,206	...	1,601	6,766	54·7	48 3	440	...	...	
	Topographical ...	2,040	...	1,094	1,390	38·5	33·5	650	...	...	

(*a*) 227 acres.
(*b*) 40 acres.

R. T. CRICHTON, MAJOR, I.A.,
Superintendent of Provincial Surveys in Bengal.

APPENDIX II.

Statement of sums expended.

District.	Description of work.	Expenditure incurred during the year under report.				Total expenditure from inception to end of the year under report.			
		Actual (direct) charge.	Share of Superintendent, Provincial Surveys' pay and cost of his office.	Four per cent. charge for instruments.	Total.	Actual (direct) charge.	Share of Superintendent, Provincial Surveys' pay and cost of his office.	Four per cent. charge for instruments.	Total.
1	2	3	4	5	6	7	8	9	10
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Bhagalpur	Traverse ...	14,820	785	624	16,229	96,443	5,204	4,065	1,05,712
	Cadastral ...	88,743	4,706	3,738	97,187	1,93,982	12,093	8,242	2,14,317
	Records ...	59,363	3,145	2,500	65,008	1,68,397	10,992	7,174	1,86,563
Purnea	Traverse for topographical.	610	32	25	667	4,328	223	181	4,732
	Traverse ordinary ...	1,143	60	48	1,251	1,20,952	7,551	5,139	1,33,642
	Cadastral ...	32,564	1,725	1,372	35,661	2,39,919	11,536	10,058	2,61,513
	Records ...	20,243	1,076	853	22,172	1,27,745	6,209	5,358	1,39,312
	Topographical ...	208	10	11	229	4,361	208	184	4,753
Monghyr	Traverse ...	34,740	1,845	1,463	38,048	34,740	1,845	1,463	38,048
Sonthal Parganas	Traverse for topographical.	1,307	69	55	1,431	1,307	69	55	1,431
	Traverse ...	26,931	1,427	1,134	29,492	26,931	1,427	1,134	29,492
	Topographical ...	531	28	22	581	531	28	22	581
Ranchi	Traverse ...	30,043	1,591	1,265	32,899	1,50,146	8,233	5,177	1,63,556
Singhbhm (Dalbhum) ...	Do. ...	20,097	1,065	...	21,162	20,097	1,065	...	21,162
Midnapore (Nayabasan) ...	Do. ...	5,878	311	...	6,189	5,878	311	...	6,189
24-Parganas—Sundarbans ...	Do. ...	50,323	2,667	...	52,990	50,323	2,667	...	52,990
	Topo. 4" ...	18,754	991	...	19,745	18,754	991	...	19,745
	Do. ...	20,486	1,086	...	21,572	20,486	1,086	...	21,572
Khulna (Dehi Bhadra) ...	Traverse 2" ...	4,657	247	196	5,100	4,657	247	196	5,100
Miscellaneous.									
Calcutta Suburbs Survey, including Panchannagram.	Traverse ...	16,218	858	...	17,076	63,594	3,329	...	66,923
	Cadastral ...	12,167	644	...	12,811	1,05,740	5,756	...	1,11,496
	Records ...	17,348	918	...	18,266	25,813	1,273	...	27,086
Patna Division—Diara ...	Traverse ...	2,435	129	102	2,666	4,825	228	201	5,254
Darjeeling—Nepal Boundary ...	Do. ...	2,036	107	86	2,229	2,036	107	86	2,229
Bhagalpur—Baneli Raj villages ...	Do. ...	300	16	13	329	300	16	13	329
Nepal *cum* Purnea and Bhagalpur Boundary.	Do. ...	407	21	17	445	504	25	21	550
Bhagalpur—Mauzas Sadikpur and Sarhan.	Cadastral ...	891	97	37	975	891	47	37	975
	Records ...	440	23	18	481	440	23	18	481
Ranchi—Training School ...	Cadastral ...	2,108	112	89	2,309	3,208	158	135	3,501
Do. Arrears	Do. ...	2,086	111	88	2,285	2,086	111	88	2,285
Singhbhum—Seraikela and Kharsawan—Arrears.	Do. ...	1,774	94	74	1,942	1,774	94	74	1,942

APPENDIX II—*concluded.*

Statement of sums expended—concluded.

District.	Description of work.	Expenditure incurred during the year under report.				Total expenditure from inception to end of the year under report.			
		Actual (direct) charge.	Share of Superintendent, Provincial Surveys' pay and cost of his office.	Four per cent. charge for instruments.	Total.	Actual (direct) charge.	Share of Superintendent, Provincial Surveys' pay and cost of his office.	Four per cent. charge for instruments.	Total.
1	2	3	4	5	6	7	8	9	10
Miscellaneous—concluded.		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
Bhagalpur—Arrears	Traverse ...	1,849	98	78	2,025	1,849	98	78	2,025
Do. Municipality ...	Cadastral ...	186	10	7	203	186	10	7	203
Bhagalpur and Purnea—copies of Records to applicants.	Records ...	5,623	297	237	6,157	5,623	297	237	6,157
Purnea—Arrears	Traverse ...	1,864	98	78	2,030	1,854	98	78	2,030
	Cadastral ...	18,386	974	774	20,134	18,386	974	774	20,134
Purnea—Raghunathpur Diara ...	Do. ...	410	21	17	448	410	21	17	448
Do. Municipality ...	Topographical ...	347	18	15	380	347	18	15	380
Bhagalpur—Irrigation traces for Settlement Department.	Cadastral ...	242	13	10	265	242	13	10	265
Total ...	Traverse ...	2,15,648	11,426	5,184	2,32,258	5,90,764	32,743	17,887	6,41,394
	Cadastral ...	1,59,557	8,457	6,206	1,74,220	5,66,824	30,813	19,442	6,17,079
	Records ...	1,03,017	5,459	3,608	1,12,084	3,28,018	18,794	12,787	3,59,590
	Topographical ...	40,326	2,133	48	42,507	44,479	2,331	221	47,031
Bengal Drawing Office ...	Standard maps ...	13,956	739	...	14,695	70,714	4,140	...	74,854
	Record section ...	3,307	175	...	3,482	14,149	713	...	14,862
	Badar section ...	3,054	162	...	3,216	13,274	765	...	14,039
	Thana maps ...	2,928	155	...	(*a*)3,083	8,137	499	...	8,636
	Trijunction mark maps.	2,457	130	...	(*b*)2,587	3,726	181	...	3,907
	Reproduction for attestation.	5,406	286	...	5,692	6,548	332	...	6,880
	Reproduction of village maps.	71,853	3,805	...	(*c*)75,658	2,63,154	14,632	...	2,77,786
	Correction of copy Orissa maps.	586	31	...	617	586	31	...	617
	District maps ...	1,029	54	...	1,083	1,721	83	...	1,804
	Patna Diara ...	267	14	...	281	267	14	...	281
	Extra Departmental work.	1,906	101	...	(*d*)2,007	1,906	101	...	2,007
Grand Total ...	.....	6,25,297	33,127	15,046	6,73,470	19,14,267	1,06,172	50,337	20,70,776

(*a*) Includes work done for Director of Land Records and special officer for Boundary list.
(*b*) Of Bihar, Orissa and Singhbhum.
(*c*) Sonthal Parganas, Bihar, Ranchi and Purnea.
(*d*) Copies of maps, &c., supplied to applicants on payment.

B. T. Crichton, Major, I.A.,
Superintendent of Provincial Surveys in Bengal.

B. S. Press—8.1.1906—30557—395—J. A. M.

REVENUE DEPARTMENT.

LAND REVENUE.

CALCUTTA, THE 23RD MARCH 1907.

RESOLUTION—No. 1699.

READ—

The Survey and Settlement Reports for the year ending the 30th September 1906 with the remarks of the Board of Revenue thereon.

The Survey and Settlement Reports for the year ending the 30th September 1906 are well within the prescribed maximum limit and have been prepared generally in accordance with the orders of Government.

2. Owing to the transfer of the eastern districts of the Province to Eastern Bengal and Assam, the present Reports deal with a reduced area, but the total outturn of work was not by any means reduced in proportion to the reduction in the size of the Province. Exclusive of the Calcutta survey and certain minor operations, the Survey and Settlement Departments dealt with work carried on in fourteen districts and in all the six Divisions of the Province. In both Departments the year's programme was all but completed, the few minor deficiencies being unavoidable. The traverse survey extended over 5,591 square miles as against 6,326 square miles in the previous year, while the cadastral and topographical surveys covered 3,676 square miles and 1,095 square miles, respectively, as against 4,667 and 572 square miles, the corresponding figures for the previous year. Including an area of 4,210 square miles completed during the year, the total area for which a record-of-rights has now been completed under the control of the Director of Land Records is 34,704 square miles in the Province as now constituted.

3. In certain cases the work done during the year has proved more expensive than in the previous year, but the Lieutenant-Governor is satisfied that every endeavour has been made to secure economy without impairing the efficiency of the work. The cost-rates of traverse survey are noted in the margin. In the district of Bhagalpur the rate is high because the features of the country were particularly difficult, and the number of traverse stations worked out to 31 per square mile, whereas in Purnea it is moderate, regard being had to the fact that the area to which it refers was only 37 square miles, while in Monghyr it is decidedly low. As to the high cost-rate in Ranchi, the Lieutenant-Governor observes that the country traversed was broken and more hilly than in the previous year, and that the transport of the party from Singhbhum added very considerably to the expenditure incurred during the year, while in Singhbhum also the country was difficult, and the area dealt with being only 573 square miles, the working party was necessarily somewhat expensive.

District.	Per square mile.	
	1904-05.	1905-06.
	Rs.	Rs.
Bhagalpur	31·7	44·7
Purnea ...	47·8	33·8
Monghyr ...	...	31·2
Ranchi ...	29·5	37·6
Singhbhum	...	36·9

The cost-rate of cadastral survey and initial record-writing in the district of Bhagalpur amounted to Rs. 134·7 as against Rs. 113·9 in the previous year, but the average size of the field was one-third of that of 1904-05, and the programme of record-writing was curtailed by 162 square miles, owing to pressure of work elsewhere. The rate in Purnea, viz., Rs. 119·2 per square mile, though higher than in 1904-05 by Rs. 10 on account of the smaller size of fields, is still moderate. The control of cadastral survey and record-writing in Chota Nagpur was taken over by the Settlement Department on the 15th October 1905, the cost-rate arrived at being Rs. 89·5 per square mile as against Rs. 82·1 and Rs. 93·2 in the two previous years when the Survey Department

was in charge of cadastral survey and initial record-writing, the latter being supervised by members of the Settlement staff. The cost of supervision by Assistant Settlement Officers, which was not included in the cost-rates of the Survey Department, being deducted for purposes of comparison, the rate falls to Rs. 79 per square mile, and may be regarded as satisfactory.

4. The experiment of placing the Settlement staff in charge of cadastral survey and record-writing in large district operations has thus proved financially successful, and there are reasons to hope that as further experience is gained greater economy will be secured. The main object of the measure was, however, to do away with the dual control of the Survey and Settlement Departments, and although it is yet too early to come to a definite conclusion as to the results of the change in system, the Lieutenant-Governor is gratified to learn that there have been fewer complaints in regard to the conduct of Inspectors and Amins, and that the survey of a large and difficult area was brought to a conclusion punctually and successfully. The Department, as now re-organized, will have an officer of the Survey Department as professional adviser in case of technical difficulties, and a stronger staff of Assistant Settlement Officers held personally responsible for the quality and progress of the survey in their respective charges, and thus there is every reason to hope that a high standard of accuracy and efficiency will be attained.

5. With the approval of the High Court a few Munsifs are now deputed annually to settlement work in order that they may acquire a practical knowledge of the settlement procedure. The period of deputation was at first limited to six months, but has been extended to eighteen months. During the year under report six Munsifs were employed as Assistant Settlement Officers, four being posted to Bihar and two to the district of Ranchi, and the Lieutenant-Governor observes that their work has given great satisfaction.

6. The proportion of non-occupancy holdings in the district of Ranchi, as disclosed by the records attested during the years 1903-04 and 1904-05, was as high as 16 per cent. and 14·6 per cent., respectively, while during the year under report the percentage is nearly 13. The chief cause of this large number is, as the Director observes, the fact that the provision of law relating to the "settled raiyat" does not apply to Chota Nagpur. Other causes are forcible dispossession and the unsettled character of the aboriginal raiyats. There is some reason to believe that formerly zamindars did not make any distinction between the non-occupancy and occupancy raiyats, as regards fixity of tenure. There is, however, no provision in the local Act analogous to section 183 of the Bengal Tenancy Act safeguarding such customary rights. The local Civil Courts have consequently interpreted the provisions of the law, with regard to non-occupancy holdings, as if they superseded all existing customs, and abolished such rights as were not expressly mentioned in the law. The position of the non-occupancy raiyats is therefore very precarious. He is a mere tenant-at-will. He can only hope to acquire occupancy rights after 12 years' possession, and in the meantime may be ejected, at any moment, whether he pays his rent or not and however much he may have improved his holding. The Settlement Officer would extend the law of the settled raiyat to the whole of Chota Nagpur, and there would appear to be much force in his contention.

7. The settlement of fair rents on a large scale was confined, during the year, to the districts of Purnea and Bhagalpur. In the former district the enhancement is trifling, being only 1·09 per cent. This is the first district in Bihar where the Settlement Department has had to settle the rents of tenure-holders on a large scale under section 7 of the Bengal Tenancy Act. The Lieutenant-Governor is glad that the general results in their case are reported to be satisfactory, the enhancements being, as a rule, small, and the rents settled in all cases, moderate. In the district of Bhagalpur, the enhancement is large, being 16·79 per cent., but it is due to the fact that in one *patti* of the Panchgachia estate, the rents had been cut down at attestation as having been illegally enhanced, bu were subsequently raised up to the prevailing rates of rent paid in the other *pattis*. It is however reported that there was no hardship, as the rents settled had been paid for about 15 years, and there has been a large extension of cultivation.

8. The recovery of costs of the survey and record-of-rights was postponed altogether in the district of Purnea till October 1907, owing to the failure of

crops due to floods, but in the districts of Bhagalpur and Ranchi practically the whole demand of the year was collected. The Lieutenant-Governor agrees with the Board that the results of the collections in these two districts is creditable to the officers concerned.

9. In paragraph 9 of the Resolution on the Survey and Settlement Reports for the year ending the 30th September 1905, the Lieutenant-Governor had occasion to notice with satisfaction the extended use of settlement records in various branches of the administration. His Honour is much gratified to find that the present Report of the Director of Land Records bears testimony to the records having been still more freely referred to than in previous years. The presumption of correctness attaching to the records appears to have been generally understood by the Magistrates and the Police, and it is reported that in land disputes they were found very useful and that copies were in many cases produced by the parties of their own motion. It is reported also from the Begusarai subdivision of the Monghyr district that the number of land and rent disputes has greatly diminished in consequence of the survey and record-of-rights, and that serious riots are now rare. In this connection the Board have drawn the attention of Government to a suggestion of the Director of Land Records that the Police, who in some districts utilise the cadastral maps in preparing sketches of the scenes of crimes, might make a more extended use of them especially in criminal cases arising out of land disputes. As observed by the Board, any difficulty due to the village maps being on the scale of 16″=1 mile may be easily got over by the use of the pentagraph. A pentagraph, if there was sufficient use for it might be supplied to the District Police office, and if not, some arrangement might be made with the District Board for such enlargements as might from time to time be required. The attention of the Inspector-General of Police will be drawn to this suggestion, and he will be asked to take such steps as may be found feasible. The Lieutenant-Governor's attention has also been directed to another suggestion that, so far as possible, the Civil Courts should be induced to quote survey numbers in all suits relating to disputes in land. His Honour will await a further report on this point from the Board of Revenue.

10. The continuous maintenance of the settlement records in Orissa has now been finally decided upon, and a scheme, framed upon the results of the experimental revision operations carried out in an area of about 46 square miles in the district of Balasore, has been approved by the Government of India. The records will, in the first instance, be brought up to date, and then a system of continuous maintenance, by means of local agency as far as possible, will be started. The revision of the records has been commenced in the district of Balasore under the immediate supervision of a civilian Settlement Officer, and the framing of a suitable Bill for the continuous maintenance has been taken in hand.

In the matter of maintenance of land records and inspection of rent-rolls in Government and Wards' estates in the Province, the Report of the Director of Land Records does not show any appreciable improvement, and the Lieutenant-Governor trusts that the Board will take steps to secure better results and a closer observance of the rules on the subject.

11. His Honour is pleased to observe that good progress has been made in the preparation of the special maps of each thana to show trijunction marks on a scale of 2″=1 mile. He notices that paragraphs 138 to 145 of the Report of the Director of Land Records bear ample testimony to a satisfactory improvement in the inspection and restoration of boundary marks, and trusts that the maps alluded to above will render the measures taken for their maintenance more effective, and will considerably cheapen future surveys.

12. Sir Andrew Fraser cannot conclude this review without expressing his appreciation of the valuable services rendered by Major Crichton and Messrs. Kerr and Lister during the year under report. He desires to take this opportunity of thanking Major Crichton, who is now taking long leave and may not return to his post, for the excellent work he has done in the Bengal Provincial Survey Department for the last sixteen years, and for the remarkable tact and courtesy he has displayed in all his relations with the Settlement Department. His Honour's thanks are also due to Messrs. Cumming, Byrne, Allanson,

Murphy, Reid and Hubback and to the other officers named in the cocludingn chapters of the two Reports.

13. Extracts from the two Reports are published for general information.

ORDER.—Ordered that this Resolution be published in the *Calcutta Gazette*, and that a copy of it, with copies of the two Reports and the Board's note, be submitted to the Government of India.

By order of the Lieutenant-Governor of Bengal,

R. W. CARLYLE,
Chief Secy. to the Govt. of Bengal.

No. 1700.

COPY, with a copy of the Survey Report, forwarded to the Deputy Surveyor-General, in Charge, Revenue Branch, Survey of India Department, for information.

No. 1701.

COPY, with a copy of the Settlement Report, forwarded to the Appointment Department of this Government for information, with special reference to paragraph 12 above.

No. 1702.

COPY, with a copy of the Settlement Report, forwarded to the Political Department of this Government, for the favour of necessary action, with reference to paragraph 9 above.

By order of the Lieutenant-Governor of Bengal,

M. C. McALPIN,
Under-Secretary to the Govt. of Bengal.

CALCUTTA,
The 23rd March 1907.

B. S. Press—25-2-1907—21566—1,063—C. O, G.

ANNUAL REPORT

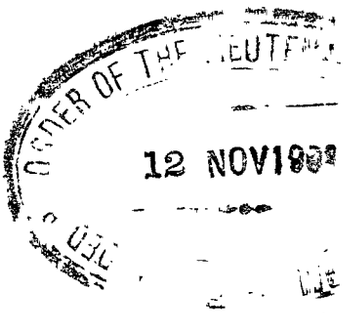
ON THE

SURVEY OPERATIONS IN BENGAL

DURING THE YEAR

1906-07.

From 1st October 1906 to 30th September 1907.



Calcutta:

THE BENGAL SECRETARIAT BOOK DEPÔT.

1908.

Published at the BENGAL SECRETARIAT BOOK DEPÔT,
Writers' Buildings, Calcutta.

OFFICIAL AGENTS.

In India—

MESSRS. THACKER, SPINK & Co., Calcutta and Simla.
MESSRS. NEWMAN & Co., Calcutta.
MESSRS. HIGGINBOTHAM & Co., Madras.
MESSRS. THACKER & Co., LD., Bombay.
MESSRS. A. J. COMBRIDGE & Co., Bombay.
THE SUPERINTENDENT, AMERICAN BAPTIST MISSION PRESS, Rangoon.
MRS. RADHABAI ATMARAM SAGOON, Bombay.
MESSRS. R. CAMBRAY & Co., Calcutta.
RAI SAHIB M. GULAB SINGH & SONS, Proprietors of the Mufid-i-am Press, Lahore, Punjab.
MESSRS. THOMPSON & Co., Madras.
MESSRS. S. MURTHY & Co., Madras.
MESSRS. GOPAL NARAYEN & Co., Bombay.
MESSRS. S. K. LAHIRI & Co., Printers and Book-sellers, College Street, Calcutta.
MESSRS. V. KALYANARAMA IYER & Co., Book-sellers, &c., Madras.
MESSRS. D. B. TARAPOREVALA, SONS & Co., Book-sellers, Bombay.
MESSRS. G. A. NATESON & Co., Madras.
MR. N. B. MATHUR, Superintendent, Nazir Kanum Hind Press, Allahabad.
THE CALCUTTA SCHOOL-BOOK SOCIETY.
MR. SUNDER PANDURANG, Bombay.
MESSRS. A. M. & J. FERGUSON, Ceylon.
MESSRS. TEMPLE & Co., Madras.
MESSRS. COMBRIDGE & Co., Madras.
MESSRS. A. R. PILLAI & Co., Trivandrum.
MESSRS. A. CHAND & Co., Punjab.

In England—

MR. E. A. ARNOLD, 41 & 43, Maddox Street, Bond Street, London, W.
MESSRS. CONSTABLE & Co., 10, Orange Street, Leicester Square, London, W. C.
MESSRS. GRINDLAY & Co., 54, Parliament Street, London, S. W.
MESSRS. KEGAN PAUL, TRENCH, TRÜBNER & Co., 43, Gerrard Street, Soho, London, W.
MR. B. QUARITCH, 11, Grafton Street, New Bond, Street, London, W.
MESSRS. W. THACKER & Co., 2, Creed Lane, London, E. C.
MESSRS. P. S. KING & SON, 2 & 4, Great Smith Street, Westminster, London, S. W.
MESSRS. H. S. KING & Co., 65, Cornhill, London, E. C.
MR. B. H. BLACKWELL, 50 & 51, Broad Street, Oxford.
MESSRS. DEIGHTON BELL & Co., Cambridge.
MR. T. FISHER UNWIN, 1, Adelphi Terrace, London, W. C.

On the Continent—

MESSRS. R. FRIEDLÄNDER & SOHN, Berlin, N. W. Carlstrasse, 11.
MR. OTTO HARRASSOWITZ, Leipzig.
MR. RUDOLF HAUPT, Halle-a-S. Germany.
MR. KARL HIERSEMANN, Leipzig.
MR. ERNEST LEROUX, 28, Rue Bonaparte, Paris.
MR. MARTINUS NIJHOFF, The Hague.

INDEX TO CONTENTS.

CHAPTER I.

PAGE.

GENERAL REMARKS ON PROVINCIAL SURVEYS 2

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND RECORDS-OF-RIGHTS IN TEMPORARILY SETTLED AND GOVERNMENT ESTATES UNDER SETTLEMENT OF RENTS AND LAND REVENUE.

Nil.

PART II.—REPORTS ON SURVEYS AND RECORDS-OF-RIGHTS IN PRIVATE ESTATES.

BHAGALPUR DIVISION	MONGHYR	DISTRICT—TRAVERSE SURVEY	. .	3
	„	„ CADASTRAL „	. .	3
	„	„ TOPOGRAPHICAL „	. .	3
PATNA „ ...	PATNA	„ TRAVERSE „	. .	4
BHAGALPUR „ ...	BHAGALPUR	„ CADASTRAL	. . . .	4
		RECORDS	. . . .	4
ORISSA „ ...	PURI	„ TRAVERSE	. . . .	4
BURDWAN „ ...	MIDNAPORE	„ „	. . . .	5
CHOTA NAGPUR „ ...	RANCHI	„ „	. . . .	5
	SINGHBHUM	„ „	. . . .	6
BHAGALPUR „ ...	SONTHAL PARGANAS	„ „	. . . .	6
PRESIDENCY „ ...	24-PARGANAS	„ „ AND TOPOGRAPHICAL	.	7
	KHULNA	„ „ „ „	.	7

PART III.—REPORTS ON MISCELLANEOUS SURVEYS.

BHAGALPUR DIVISION	BHAGALPUR	—COLGONG AND MAWALIKABAD	 8
	„	AND PURNEA—NEPAL BOUNDARY KOSI DIARA	9
	PURNEA	DISTRICT—DIARA VILLAGES	 9
	DARJEELING	„ NEPAL BOUNDARY (MECHI RIVER)	9
	MONGHYR	„ JAMALPUR MUNICIPALITY	. . 9
	„	„ BINDA DIARA (CHECK SURVEY)	. 9
	BHAGALPUR	„ BHAGALPUR MUNICIPALITY REVISION	 9
PRESIDENCY „	—24-PARGANAS—CALCUTTA SUBURBS SURVEY		 10
CENTRAL PROVINCES—BILASPUR DISTRICT—UDAIPUR STATE BOUNDARY			. . 10

PART IV.—REPORT ON THE BENGAL DRAWING OFFICE.

STANDARD MAPPING SECTION 12

TRAVERSE CHART SECTION 13

TRIJUNCTION MARKS AND THANA MAPPING SECTION 13

REPRODUCTION OF VILLAGE MAPS SECTION 13

BADAR SECTION 16

MAPS RECORD SECTION 16

CHAPTER III.

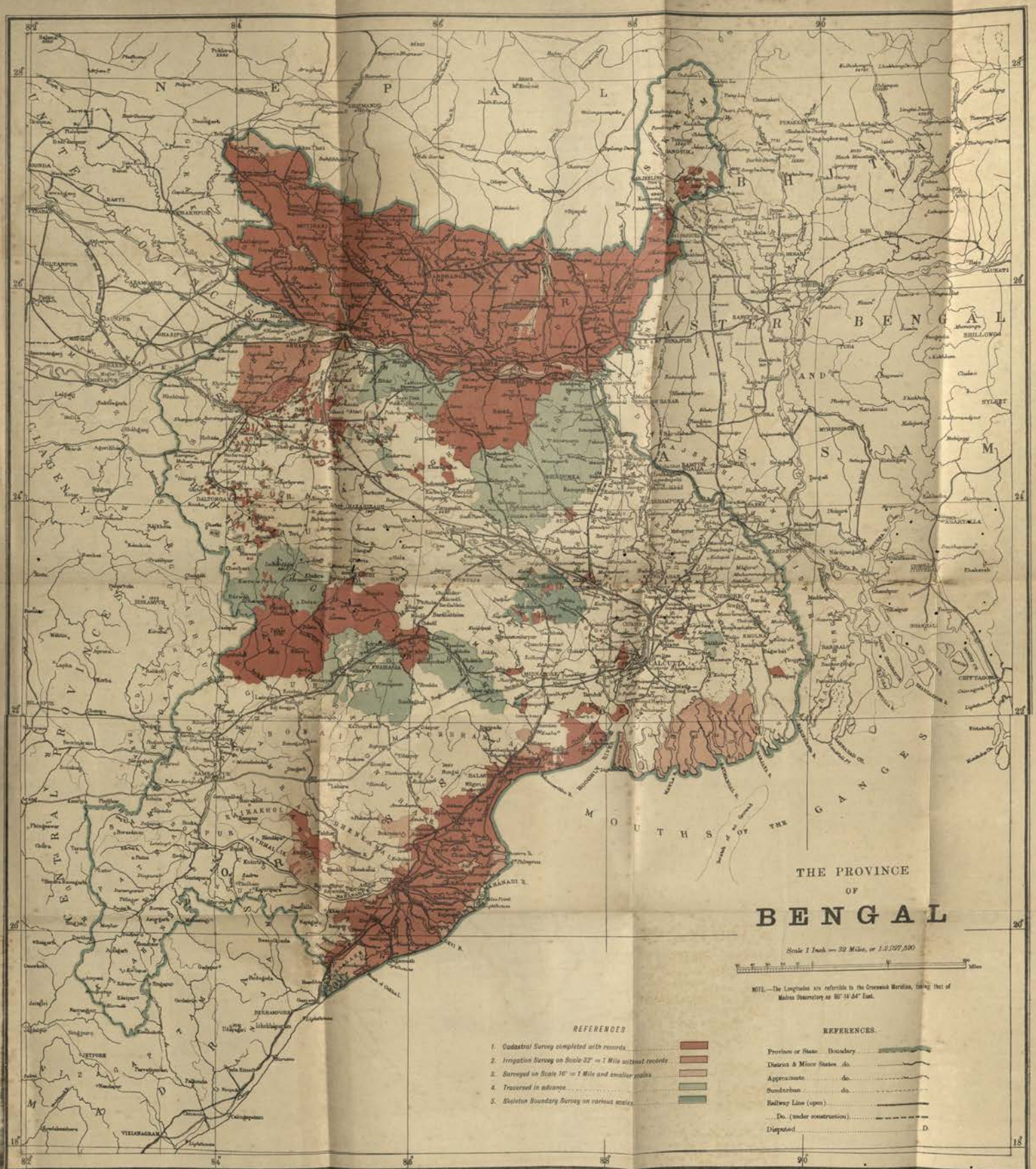
	Page.
PART I.—TOURS OF THE SUPERINTENDENT OF PROVINCIAL SURVEYS	17
II.—SERVICES OF OFFICERS	17

LIST OF APPENDICES.

APPENDIX I.—PART A.—SUMMARY OF OUTTURN OF WORK	18
PART B.—STATEMENT OF OUTTURN AND COST RATES	19
II.—EXPENDITURE STATEMENT	20

LIST OF INDEX MAPS.

PROVINCE OF BENGAL	*To face page*	1
MONGHYR DISTRICT	„ „	3
PATNA „	„ „	4
BHAGALPUR „	„ „	4
PURI „	„ „	4
MIDNAPORE „	„ „	5
RANCHI „	„ „	5
SINGHBHUM „	„ „	6
SONTHAL PARGANAS „	„ „	
24-PARGANAS „	„	7
KHULNA „	„ „	4
PANCHANNOGRAM	„ „	10


THE PROVINCE
OF
BENGAL
Scale 1 Inch = 32 Miles, or 1:2,027,500
Miles
NOTE.—The Longitudes are referrible to the Greenwich Meridian, taking that of Madras Observatory as 80° 14′ 54″ East.
REFERENCES
1. Cadastral Survey completed with records
2. Irrigation Survey on Scale 32″ = 1 Mile without records
3. Surveyed on Scale 16″ = 1 Mile and smaller scales
4. Traversed in advance
5. Skeleton Boundary Survey on various scales
REFERENCES.
Province or State Boundary
District & Minor States do.
Approximate do.
Sunderbun do.
Railway Line (open)
Do. (under construction)
Disputed
N E P A L
B H U T A N
A S S A M
EASTERN BENGAL AND ASSAM
BENGAL
BIHAR
ORISSA
CHHATTISGARH
UNITED PROVINCES
CENTRAL PROVINCES
BOMBAY
MADRAS
MOUTHS OF THE GANGES
CALCUTTA
DARJEELING
SHILLONG
SYLHET
CHITTAGONG
DACCA
PATNA
GAUHATI
HYDERABAD
VIZIANAGRAM
BERHAMPORE
SAMBALPUR
RAIPUR
BILASPUR
NAGPUR
JUBBULPORE
ALLAHABAD
BENARES
GHAZIPUR
GORAKHPUR
BASTI
FYZABAD
SULTANPUR
SHAHJAHANPUR
BAREILLY
MORADABAD
MEERUT
SAHARANPUR
DEHRA DUN
SIMLA
AMBALA
LUDHIANA
UMBALLA
DELHI
GURGAON
MUTTRA
AGRA
ALIGARH
ETAWAH
CAWNPORE
FATEHPUR
BANDA
HAMIRPUR
JHANSI
LALITPUR
GWALIOR
INDORE
BHOPAL
KOTAH
UDAIPUR
JODHPUR
BIKANIR
JAISALMIR
JEYPORE
KHERWARA
MOUNT ABU
AJMIR
MERWARA
KOTRI
HYDERABAD
KARACHI
KOLHAPUR
BELGAUM
DHARWAR
KANARA
SATARA
POONA
AHMADNAGAR
KHANDESH
NASIK
THANA
SURAT
BARODA
AHMADABAD
KAIRA
PANCH MAHALS
RAJPIPLA
BROACH
KATHIAWAR
CUTCH
PALANPUR
MAHI KANTHA
NAVSARI
DAMAN
GOA
BIJAPUR
KALADGI
NIZAMS DOMINIONS
MYSORE
COORG
NILGIRI HILLS
SALEM
COIMBATORE
MADURA
TINNEVELLY
TRAVANCORE
COCHIN
PALGHAT
NILAMBUR
CALICUT
MALABAR
VIZAGAPATAM
GANJAM
PURI
CUTTACK
BALASORE
MIDNAPORE
HOOGHLY
BURDWAN
BANKURA
BIRBHUM
MURSHIDABAD
NADIA
JESSORE
KHULNA
BARISAL
BACKERGUNJ
FARIDPUR
RAJSHAHI
DINAJPUR
RANGPUR
BOGRA
PABNA
MALDA
JALPAIGURI
COOCH BEHAR
GOALPARA
KAMRUP
DARRANG
NOWGONG
SIBSAGAR
LAKHIMPUR
NAGA HILLS
KHASI HILLS
GARO HILLS
LUSHAI HILLS
MANIPUR
CACHAR
TIPPERAH
NOAKHALI
CHITTAGONG HILL TRACTS
HOOGHLY R.
BHAGIRATHI R.
JALANGI R.
MATLA R.
BARAKAR R.
DAMODAR R.
SUBARNREKHA R.
BRAHMANI R.
BAITARANI R.
MAHANADI R.
GODAVARI R.
KRISHNA R.
PENNAR R.
PALAR R.
CAUVERY R.
VAIGAI R.
TAMBRAPARNI R.
PERIYAR R.
BHAVANI R.
NOYYAL R.
PONNAIYAR R.
PALAR R.
KISTNA R.
TUNGABHADRA R.
GHATAPRABHA R.
MALPRABHA R.
KALINADI R.
KALI R.
SHARAVATI R.
NETRAVATI R.
PERIYAR R.
PAMBAR R.
VAIPAR R.
TAPTI R.
NARBADA R.
MAHI R.
SABARMATI R.
LUNI R.
BANAS R.
CHAMBAL R.
SIND R.
BETWA R.
KEN R.
SON R.
GANGES R.
JUMNA R.
GOGRA R.
GANDAK R.
KOSI R.
TISTA R.
TORSA R.
MANAS R.
BRAHMAPUTRA R.
SUBANSIRI R.
DIHANG R.
DIBONG R.
LOHIT R.
KAPILI R.
DHANSIRI R.
KOPILI R.
BARAK R.
KARNAPHULI R.
SANGU R.
MAYURAKSHI R.
BARAKAR R.
KOSI R.
MECHI R.
MAHANANDA R.
PUNARBHABA R.
KARATOYA R.
ATRAI R.
TISTA R.
TORSA R.
MANAS R.
BRAHMAPUTRA R.
SUBANSIRI R.
DIHANG R.
DIBONG R.
LOHIT R.
KAPILI R.
DHANSIRI R.
KOPILI R.
BARAK R.
KARNAPHULI R.
SANGU R.
MAYURAKSHI R.
BARAKAR R.
KOSI R.
MECHI R.
MAHANANDA R.
PUNARBHABA R.
KARATOYA R.

ANNUAL REPORT

OF

THE SUPERINTENDENT OF PROVINCIAL SURVEYS, BENGAL

ON THE

SURVEY AND RECORDS-OF-RIGHTS OPERATIONS IN BENGAL

DURING THE SURVEY YEAR 1906-1907.

No. $\frac{4421}{R./7-121}$.

FROM CAPTAIN F. C. HIRST, I.A.,

Offg. Superintendent of Provincial Surveys in Bengal,

TO THE SECRETARY TO THE BOARD OF REVENUE, LOWER PROVINCES.

Dated Hazaribagh, the 26th December 1907.

SIR,

I HAVE the honour to submit my Report on the Survey Operations in Bengal during the past survey year from 1st October 1906 to 30th September 1907.

2. Major R. T. Crichton, the incumbent of the appointment I am officiating in, held charge until March 28th 1907, when he went home on long leave in very indifferent health. Since that date I have held charge myself.

CHAPTER I.

General Remarks.

3. The outturn for the year, viz., 275 square miles of triangulation for topographical work, 6,309 square miles of Traverse Survey, 1,709 square miles of Cadastral Surveys, 1,872 square miles of Record Writing and 1,591 square miles of Topographical Survey is in each item in excess of that reported last year. The full programme has been worked up to, and it has been sometimes slightly exceeded; one case of apparent failure, viz., the Topographical Survey of a block of hills in the south of the Monghyr District is not really what it appears to be; it was decided at a somewhat late date to cadastrally survey this area, with the result that men who were expected to be used on Topographical work had to be utilized for Traverse survey.

Changes during the year.

(*a*) The final handing over of cadastral work in Bengal to the Settlement Department has been accomplished; No. 4 Party (Bihar) has been broken up, and its two cadastral sections transferred, almost bodily, to the executive control of the Settlement Officer, Bihar. This change takes effect from the first day of the survey year 1907-08.

(*b*) The Settlement Department has, so far, been compelled to use rough 4″ plots as the basis of thana maps; finding this to be the case I have altered the procedure so that in future the Settlement Officer will have a sufficiently accurate basis for Thana Maps.

(*c*) By order of the Surveyor General all the records (sets up) of Traverse work, after completion, have been copied so that each Settlement Officer may receive a copy for his own use, and so that, on the completion of the Settlement Operations in any district, the local authorities will have a complete record of Traverse work done; another reason for the necessity of this procedure is that the Topographical Surveyors, who will eventually revise or resurvey areas covered in Revenue Operations, may have, at any time, all the records which they may require; to accomplish this, extra work has been thrown on Traverse sections, but when the resulting advantages are considered, the slight extra cost involved is of little importance. No harm can ever come from duplicate copies of important records being kept in separate places and, provided that the cost of producing duplicates is not excessive, it will generally be admitted that their provision is advisable.

(*d*) The professional control of Bengal Surveys has, from the 1st September 1907, been transferred from the Deputy Surveyor General to the Surveyor General.

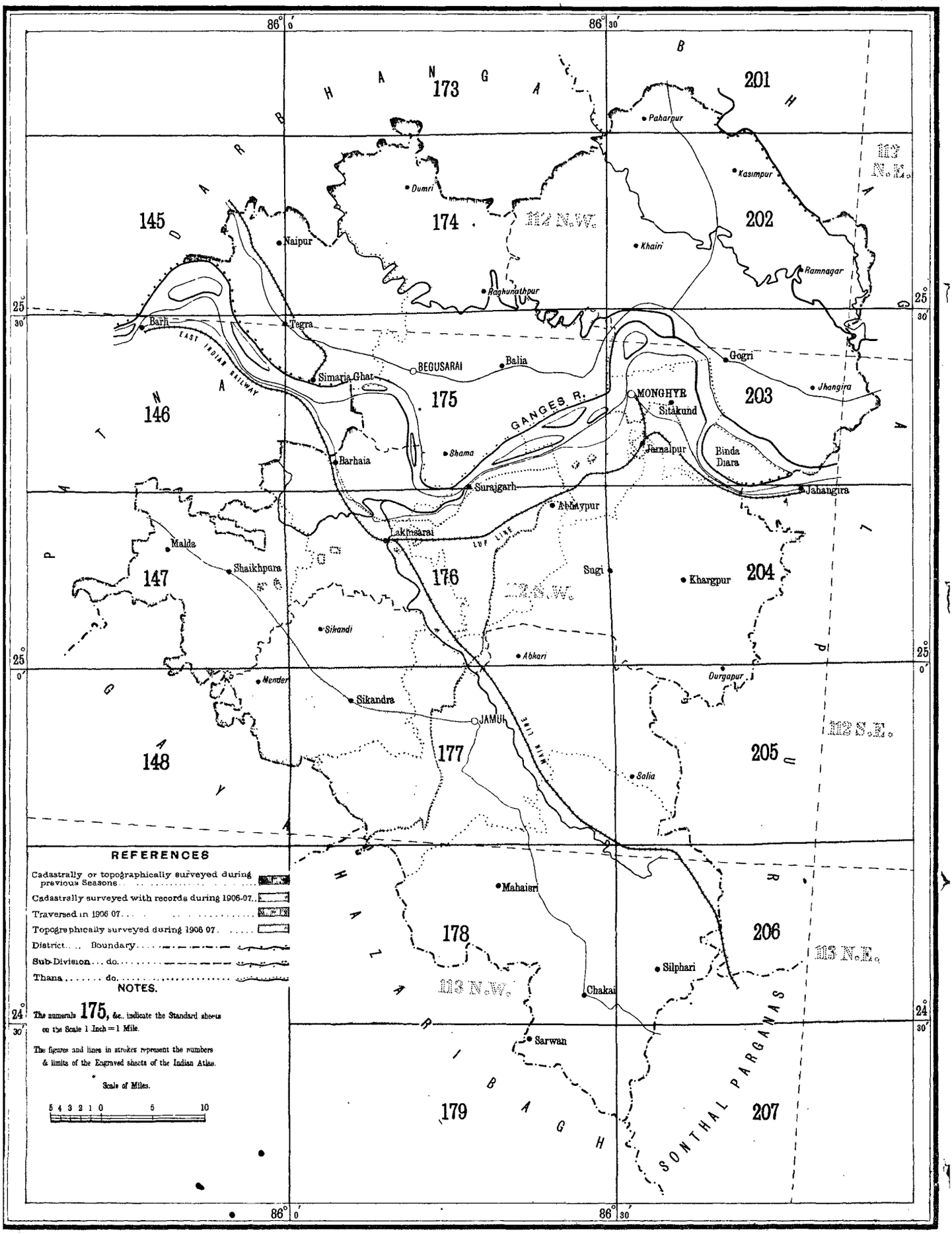
(*e*) My office work has increased to a great extent; this is due to the control of the Surveys of this Province and the transferred districts of Eastern Bengal being under the same survey officer, who is subordinate to two Boards of Revenue; the partition caused an immediate duplication of all reports and returns, and now, as changes in procedure in both Provinces occur, since these seldom coincide, there is a gradual drifting apart which tends to make my appointment more and more difficult; so far the interests of the two Governments do not conflict, but it is doubtful if they will not do so in the near future.

(*f*) The question of accounts has received much attention during the year; it is proposed to substitute the system of a permanent advance for that of Letters of Credit, it being seldom that a Survey Party in Bengal will be working far from a local treasury. A European Accountant (Mr. Picachy) has been lent me and he has for some months been engaged in framing the rules which it is earnestly hoped will lead to a change of system at the beginning of the next financial year. Mr. Picachy has given me every possible help, and even if the new system is not introduced his suggestions on many points will have facilitated work and reduced considerably the risk there is, under the present system, of loss of Government money.

BENGAL

INDEX TO THE CADASTRAL SURVEY IN DIST. MONGHYR

1906-07. No. 4 PARTY.



REFERENCES

Cadastrally or topographically surveyed during previous Seasons

Cadastrally surveyed with records during 1906-07.

Traversed in 1906 07

Topographically surveyed during 1906 07

District ... Boundary

Sub-Division ... do.

Thana ..... do.

NOTES.

The numerals **175**, &c., indicate the Standard sheets on the Scale 1 Inch = 1 Mile.

The figures and lines in strokes represent the numbers & limits of the Engraved sheets of the Indian Atlas.

Scale of Miles.

5 4 3 2 1 0 5 10

Reg. No. 1211 D., 08.—S. I.—525.

Helio., S. I. O., Calcutta

CHAPTER II.

PART I.—REPORTS ON SURVEYS AND RECORDS-OF-RIGHTS IN TEMPORARILY-SETTLED AND GOVERNMENT ESTATES UNDER SETTLEMENT OF RENTS, AND LAND REVENUE.—*NIL.*

PART II.—REPORTS ON SURVEYS AND RECORDS OF RIGHTS IN PRIVATE ESTATES.

MONGHYR DISTRICT.

Traverse Survey.

4. THANAS Surajgarha, Sikandra, Sheikhpura and that area of Thana Jamui which remained over from last year, were traversed during the season, the area traversed being 1,190 square miles, which includes an area of 2·65 square miles of scattered Government Estates previously surveyed, but which had to be retraversed. The area also includes 275 square miles of hilly country traversed for cadastral as well and topo purposes (*vide* paragraph 15.)

5. In this area there are 15,284 new theodolite stations of which 1,956 are marked with stones, 12,724 with clay cylinders and 604 with pegs.

6. Three Great Trigonometrical Stations were connected with, and the angular work was checked against the results of 79 azimuth observations. The mean magnetic variation is 1°. 27′-40″ East.

7. The demarcation was good and the travease boundaries agree very well with the Revenue Survey boundaries.

8. The work has been plotted on 1,725 sheets. Where "tola" boundaries were pointed out to the traversers, theodolite stations have been laid down along them and the "tolas" have been plotted separately.

9. The work has proved well mathematically and all the computations are practically complete.

Cadastral Survey.

10. The area cadastrally surveyed and of which the record writing was done was 1,307 square miles; this area includes 157 square miles of the hill block mentioned in paragraph 15.

11. The survey work was checked by 4636 linear miles of test survey which give an incidence of 3·7 linear miles of test survey to every square miles of detail survey.

12. The entries of 256,290 plots were checked by the survey staff which gives an average of 28 per cent of the total number of plots.

13. There were 252 boundary disputes and 38,840 interior disputes, of which 243 of the former and 33,838 of the latter have been decided. The balance will be attended to at the attestation stage.

14. The attendance of the zamindars and raiyats was fair. The average daily outturn per man was in survey 20 acres and in Khanapuri 50 fields.

Topographical Survey.

15. The area triangulated and traversed, a very small part of which was done last season, was 275 square miles. Two secondary and 28 intersected points were fixed, and these, together with the points fixed last season, give 21 secondary and 43 intersected points. The triangulated area includes the block of hills in thanas Monghyr, Jamui, Kharagpur, Surajgarha and Sikandra.

16. In the hill area 1,698 theodolite stations were fixed, all of which were marked by pegs.

The angular work was checked against the results of 4 azimuth observations and the mean magnetic variation is 1°-38′ East.

17. Each block of cultivation in the hills, with one exception, was surrounded by traverse stations and these blocks were connected with the triangulated points. This entailed a great deal of line clearing through jungle. The area of cultivation in the hill block is 12·64 square miles.

18. As the 2″ scale survey was not begun till after the cadastral survey of the cultivation was finished, only 51 square miles of 2″ work was completed; these have not been taken credit for in this report.

19. The topographical work was tested by 34 linear miles of test lines along which observations for heights were taken. The work proved to be good.

20. All the computations have been completed and the remaining area will be dealt with during the next field season.

Patna District.

Traverse.

21. The area traversed in this district is 851·6 square miles, which includes an area of 21·6 square miles of Government Estates and Tikari villages that were surveyed in previous years.

22. The area comprises Thanas Mokameh, Barh, Bihar and Silao, 1453 villages being traversed in all.

23. 16,165 new Theodolite Stations have been laid down, of which 2,408 are marked with trijunction stones, 13,147 with clay cylinders and 610 with pegs.

24. Six Great Trigonometrical Stations have been connected with and the angular work checked against the results of 62 Azimuth observations. The mean magnetic variation is 1°34′ East.

25. The entire work has been plotted on 1,629 sheets. Where "tola" boundaries were pointed out to the Traversers, the tolas have been traversed and plotted separately. The work has proved well and all the computations are practically complete. The plots have been sent to the Settlement Officer.

26. The origin of the survey is the intersection of Latitude 25°30′, Longitude 85°30′.

27. The demarcation was good, consequently the boundaries according to the traverse survey agree very well with the Revenue Survey Boundaries.

Bhagalpur District.

Cadastral Survey.

28. The area cadastrally surveyed was 375 square miles. The records of this area and of the area 163 square miles cadastrally surveyed last year, but for which records were not written, that is of a total area of 538 square miles were prepared.

29. The survey work was tested by 1,238 linear miles of check survey, which gives an incidence of 3·3 linear miles of test survey to each square mile of detail survey.

30. The entries of 91,956 plots were tested by the survey staff which gives an average of 27 per cent. of the total number of plots.

31. There were 85 boundary and 10,860 interior disputes. Of the former 78 and of the latter 10,310, were decided, the balance have been left for the attestation stage.

32. The attendance of the zamindars and raiyats was only fair. The average daily outturn per Amin in survey was 23 acres and in Khanapuri 51 fields.

Puri District.

Traverse Survey.

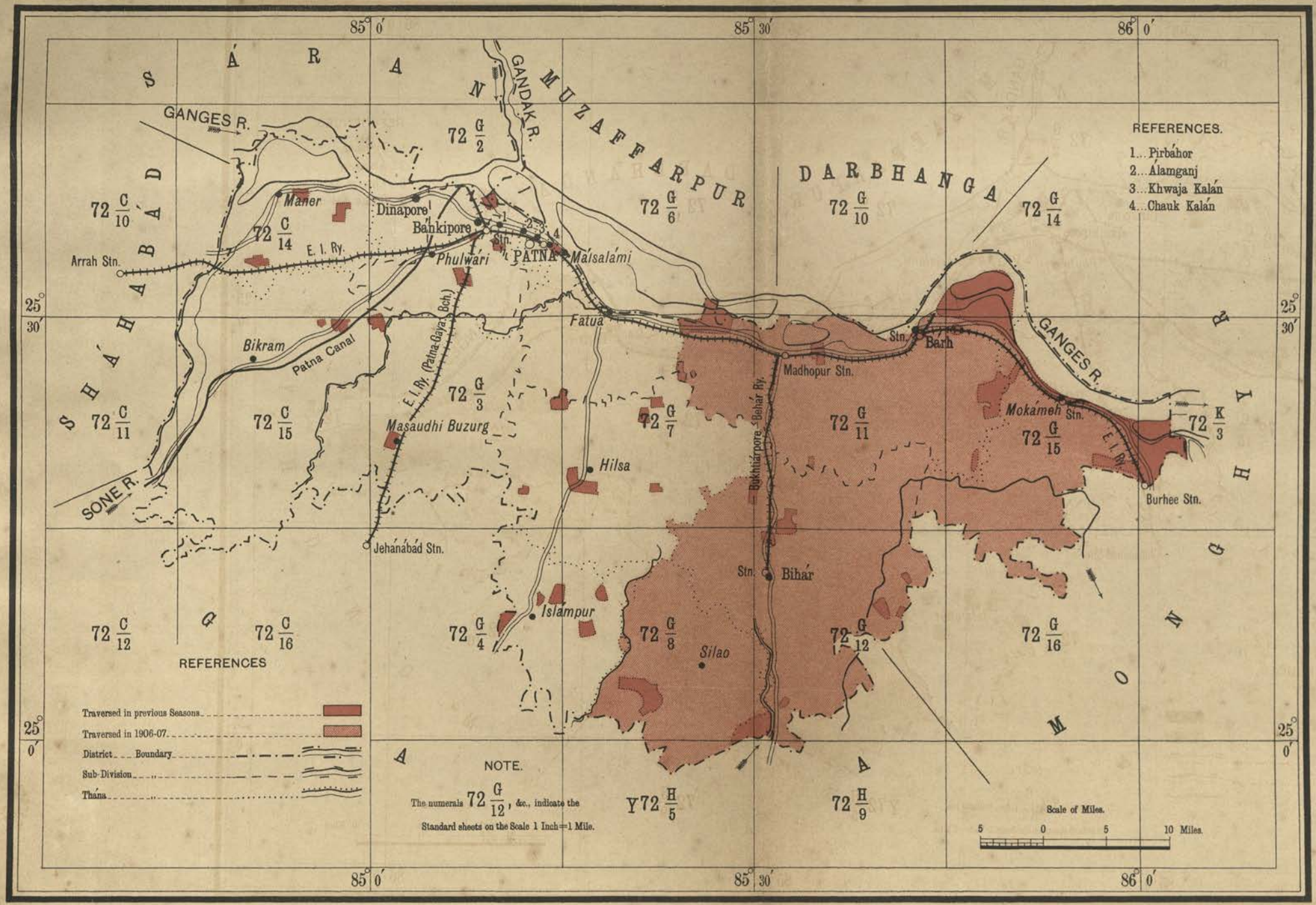
33. The tract dealt with embraced 96·9 square miles lying between the Chilka Lake and the sea, touching, on the west, the Presidency of Madras; the area is low lying and flat and nearly every village encountered is protected by high embankments; the lands surveyed fall in Jagir Mahal lands of Parganas Malud, Parikud, Bajarkot and Mitha Kuan.

BENGAL

1906-07

INDEX to the TRAVERSE & CADASTRAL SURVEYS in DISTRICT PATNA

No. 4 PARTY.



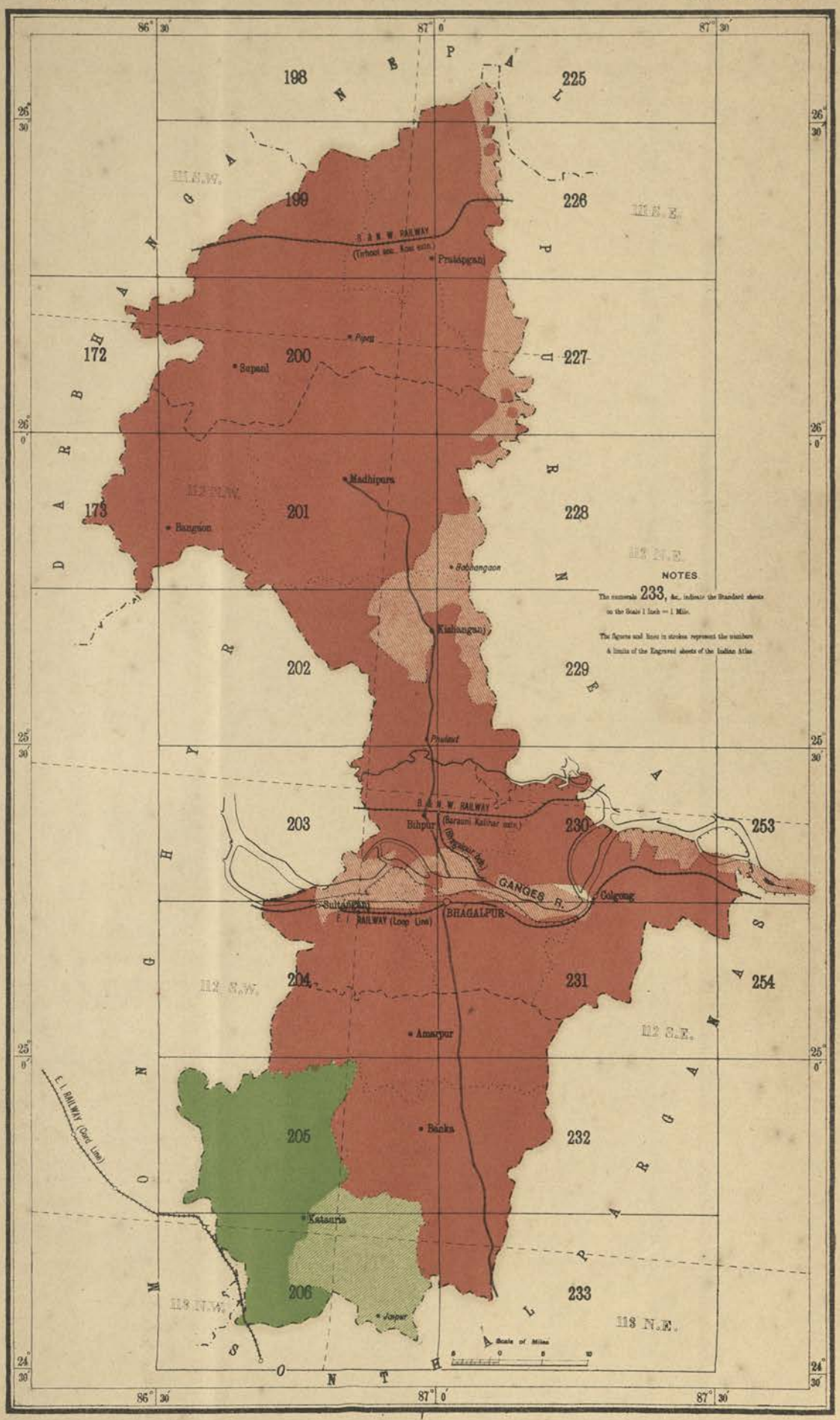
Reg. No. 1215 D., 08.—S. I.—525

Helio. S. I. O., Calcutta

BENGAL SURVEY.

INDEX TO THE TRAVERSE & CADASTRAL SURVEYS IN DISTRICT BHAGALPUR.

1906-07. No. 4 PARTY.



Reg. No. 1216 D., 08.—S I.—025.

Helio., S. I. O., Calcutta.

REFERENCES.

Cadastrally Surveyed with Records in previous Seasons . . . .

Traversed & Topographically Surveyed 4-inch Scale in previous Seasons . .

Cadastrally Surveyed with Records in 1906-07. . . . . .

Cadastrally Surveyed in 1905-06, records written 1906-07. . . . . .

District . . . Boundary. . . . . .

Sub-Division . . . do. . . . . .

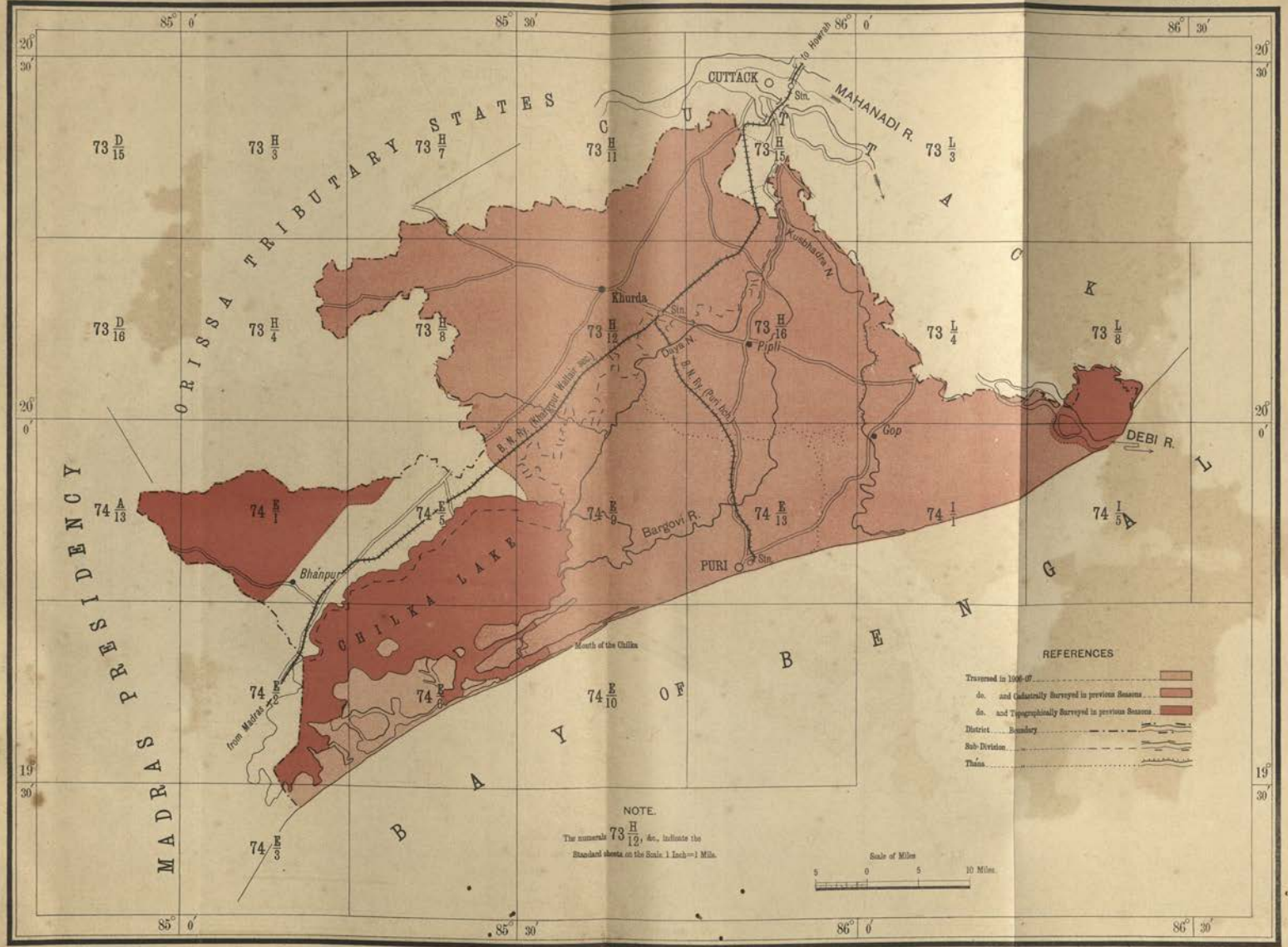
Thana . . . . . do. . . . . .

BENGAL

1906-07

INDEX to the TRAVERSE SURVEYS in DISTRICT PURI

No. 5 PARTY.



REFERENCES

Traversed in 1906-07

do. and Cadastrally Surveyed in previous Seasons

do. and Topographically Surveyed in previous Seasons

District Boundary

Sub-Division

Thana

NOTE.

The numerals 73 H/12, &c., indicate the Standard sheets on the Scale 1 Inch=1 Mile.

Scale of Miles

5 0 5 10 Miles

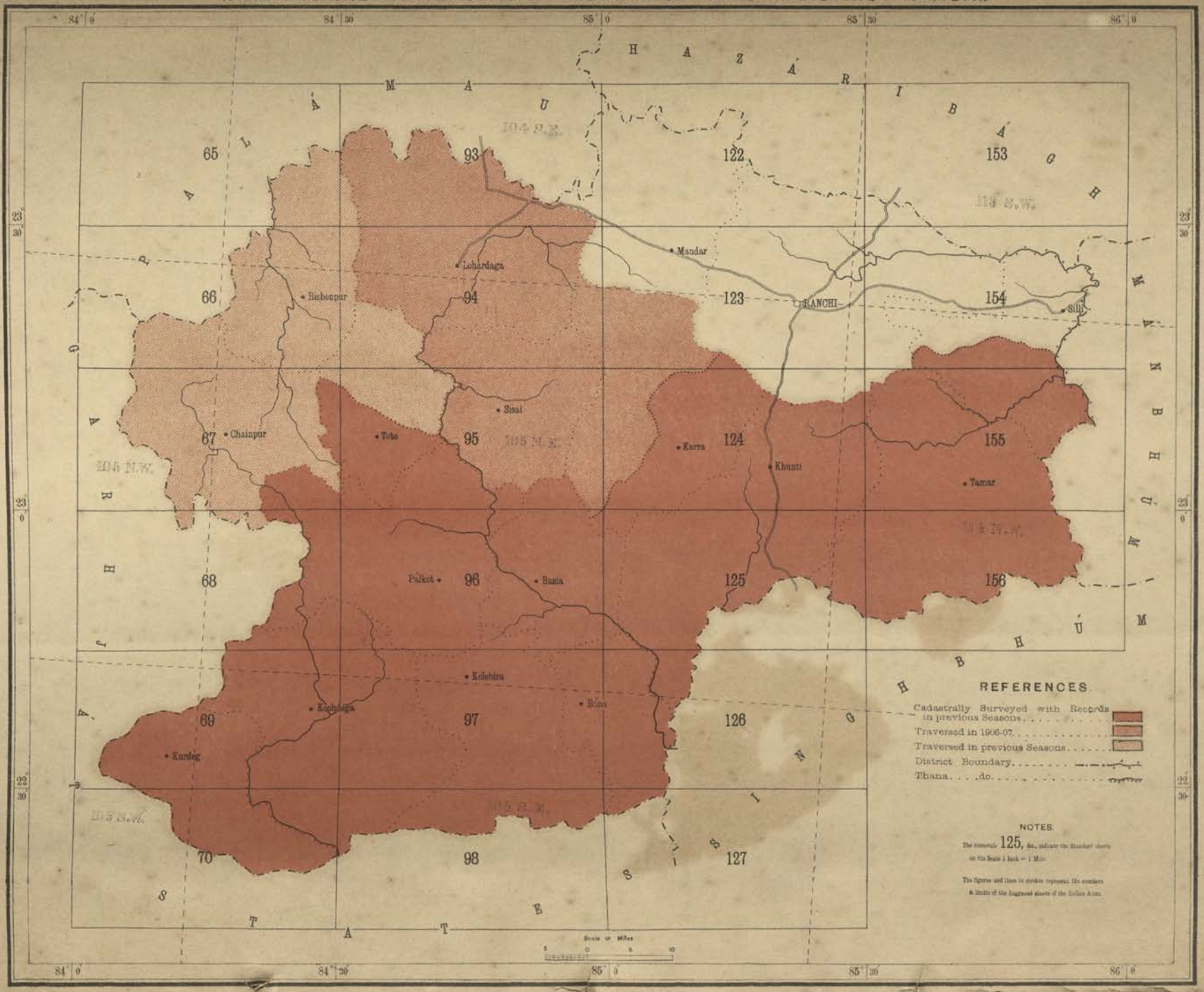
Reg. No. 1913 D. '06.—S. I.—525.

Published under the direction of Colonel F. B. Longe, R.E., Surveyor General of India, 1907.

Helio. S. T. O., Calcutta

BENGAL SURVEY.

1906-07. **INDEX TO THE TRAVERSE & CADASTRAL SURVEYS IN DISTRICT RÁNCHI.** No. 5 PARTY.

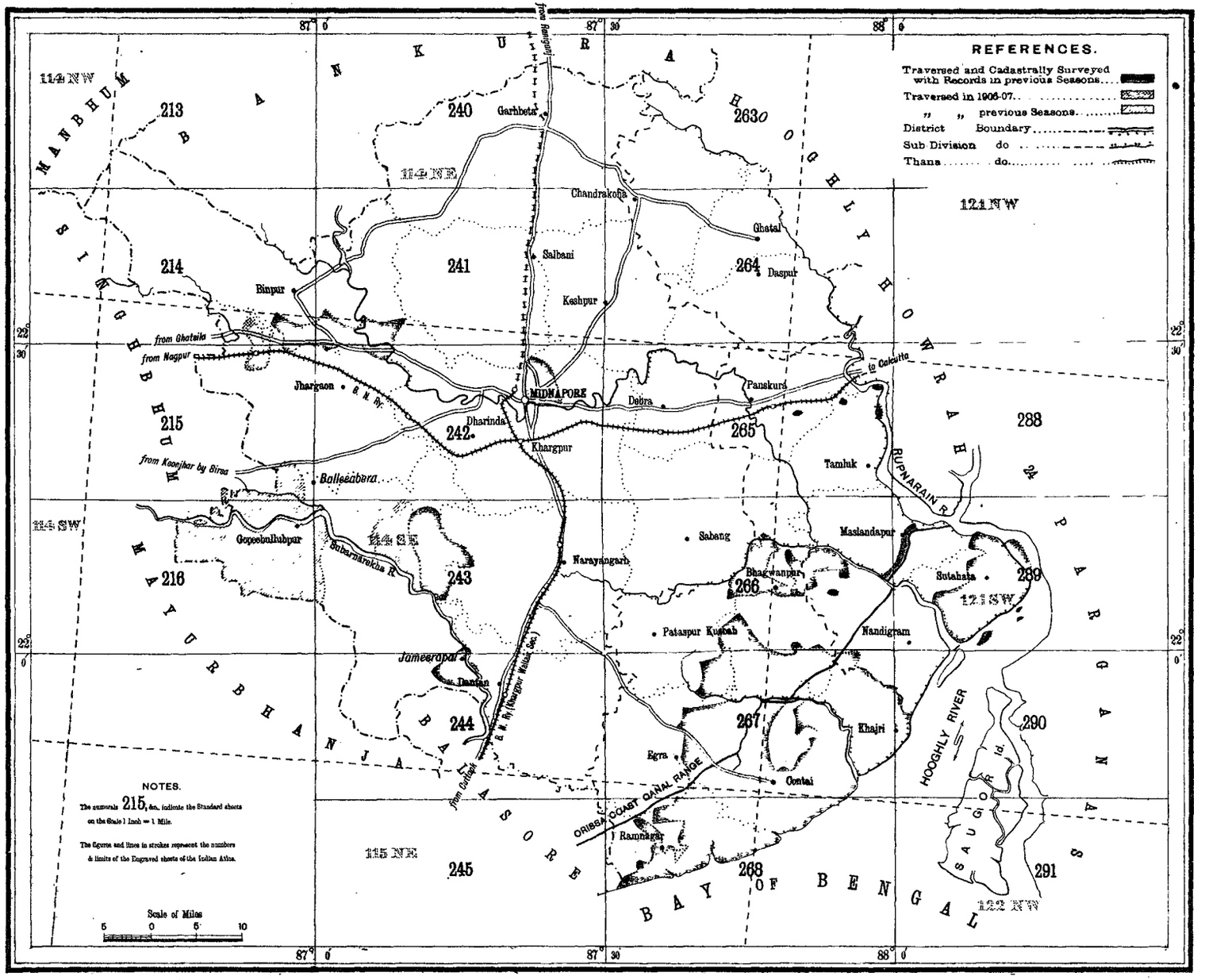


No. 1219 D., 08.—S. I.—525

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT MIDNAPORE.

1906-07 — No. 5 PARTY



Reg. No. 1218 D., 08.—S. I.—526.

Helio., S. I. O., Calcutta

34. No demarcation was possible as sanction to take up the work was received very late; fortunately, in most cases, village boundaries followed the beds of streams and so no difficulty resulted. The people also gave considerable help and the area surveyed being close to the sea coast, the health of the establishment was good.

35. The origin used was the intersection of Latitude 20° 19′ 49″·07 and Longitude 86° 32′ 43″·75, this being the origin of former surveys in the district. I have not been able to discover why such an unusually intricate origin was adopted; its main result is that unnecessary complications in computations are introduced and it may be well to record here that for future operations Latitude and Longitude coordinates of whole or half degrees, or one of each, should be adhered to.

36. 14 Azimuths were observed to check the angular work and the mean Magnetic Variation was found to be 0°-42′ East.

37. Altogether 1,455 theodolite stations were used, where possible the old marks were picked up and utilized; out of the total number of stations observed at 119 new stones and 1,336 pegs were embedded.

38. As the plots were urgently required by the Settlement Officer, two chains of different lengtbs (100 links and 93 links) were used, so as, as far as possible, to eliminate the possibility of errors.

39. Five Great Trigonometrical Stations were connected with and the work proved well.

40. All the plots were sent to the Settlement Officer during the early part of the field season and all computations, etc., are complete.

Midnapore District.

Traverse Survey.

41. The area surveyed consisted of 14·86 square miles in Pargana Ghatsilla.

42. No demarcation was done by the inhabitants but no obstruction was encountered.

43. The origin used was intersection of Latitude 22° 30′ with Longitude 87° 30′.

44. Six Azimuths were observed and the mean Magnetic variation is 1°-9′ East.

45. Stone prisms were used for all Trijunctions, and local stones for most of the intermediate stations. 507 Theodolite Stations were observed at and marked as follows:—323 by stones, 146 by galvanized iron cylinders and 38 by pegs.

46. As no Great Trigonometrical Stations fell near the area, connections were made with the adjacent Main Circuit work of Singhbhum District. The work proved well.

47. The 16″ and 4″ plots were supplied to the Settlement Officers early in the field season and all the records are bound and completed.

Ranchi District.

Traverse Survey.

48. During the year an area of 1,128 square miles falling in Thanas Lohardaga, Sisai and Karra was traversed for Cadastral Survey.

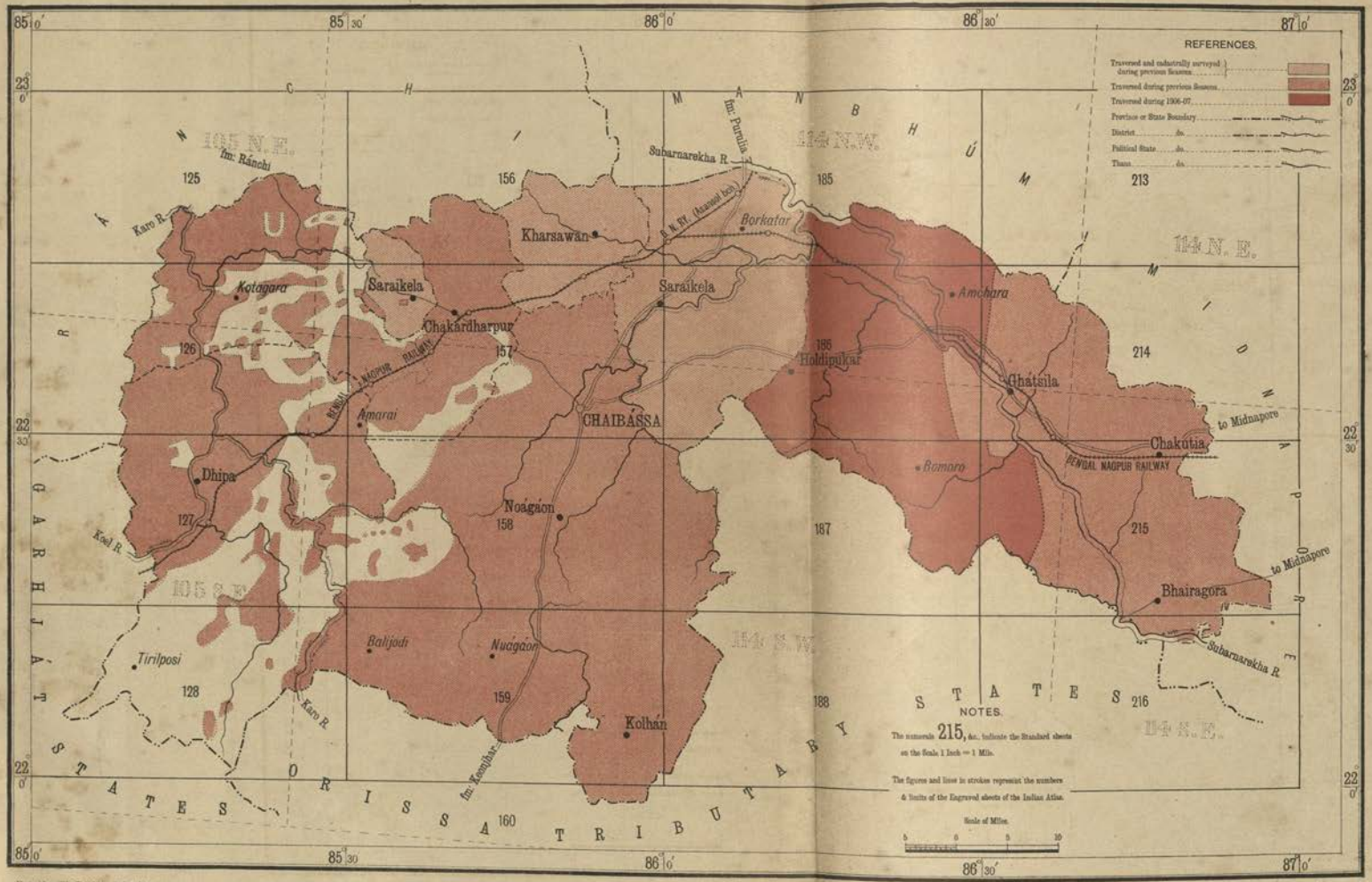
49. The angular work was checked by 128 Azimuths, which give a mean Magnetic Variation of 1°-25′ East. Four Great Trigonometrical Stations were connected with.

50. The area covered consists on the north of jungle clad hills of a maximum height of about 3,500 feet above sea level, breaking down on to an undulating and tolerably well cultivated plateau averaging 2,350 feet, and sloping south by east. The Subtense Bar and Frasers' height indicating staff had to be used constantly, and with bad demarcation by the inhabitants, and in places, heavy line clearing through dense jungle, the programme was a somewhat difficult one.

BENGAL SURVEY.

INDEX TO THE CADASTRAL SURVEY IN DISTRICT SINGHBHUM.

1906-07 No. 5 PARTY.



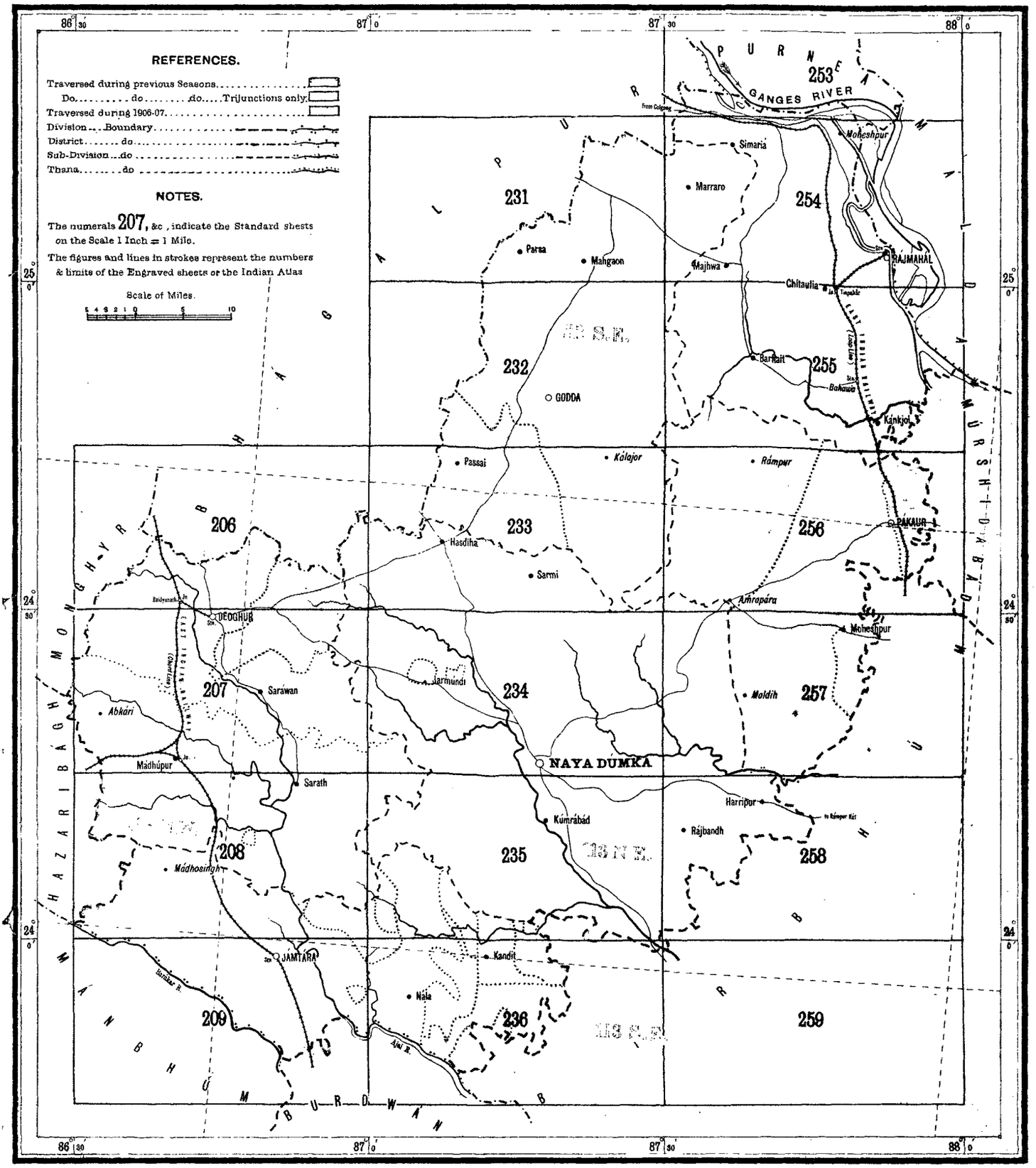
Reg. No. 1214 D.L.08—S. I.—928

Heliot. S. I. C., Calcutta

BENGAL

INDEX TO THE TRAVERSE SURVEY IN DIST. SONTHAL PARGANAS

1906-07. No. 5 PARTY.

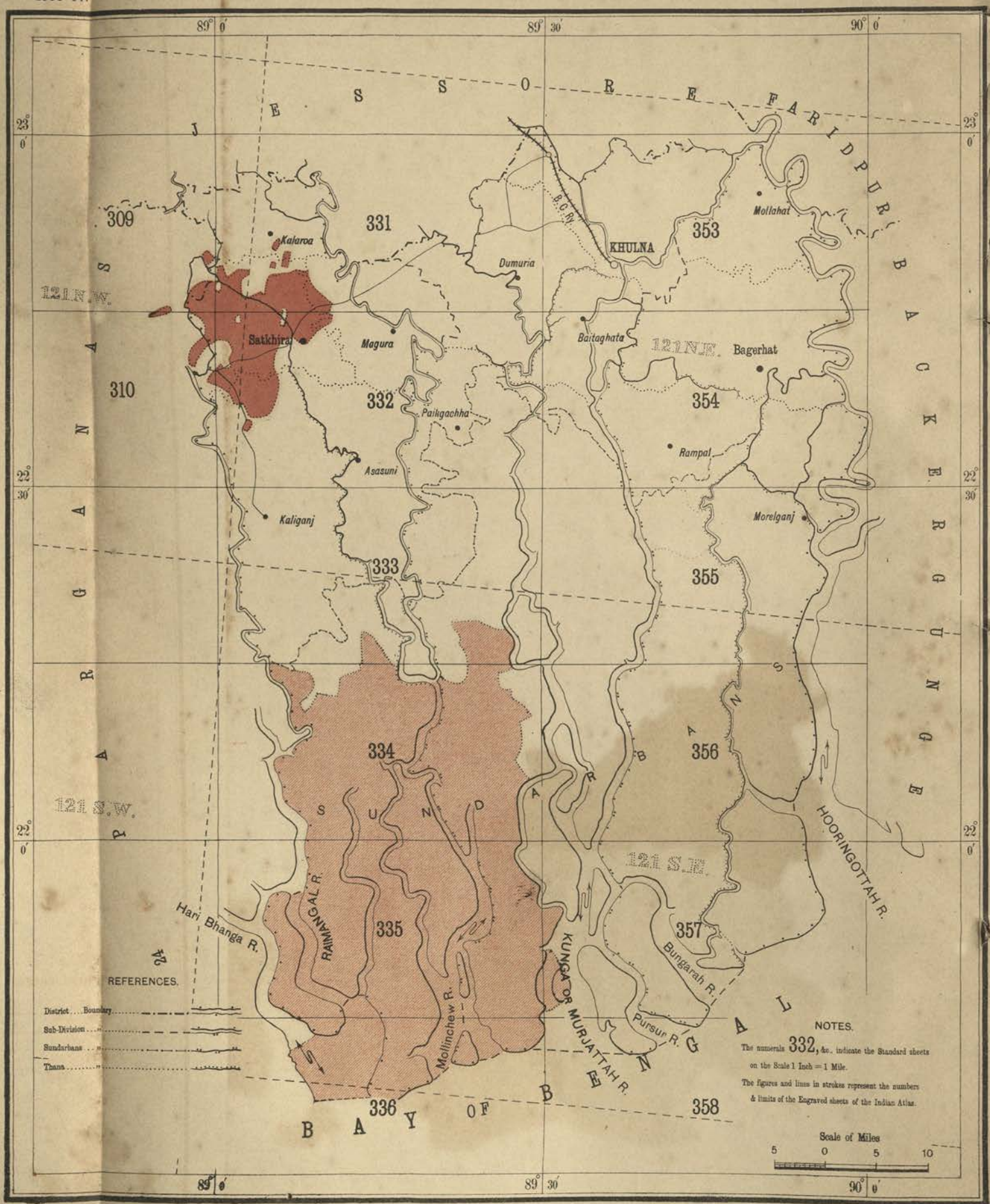


Reg. No. 1220 D '08—S I—525. Head S. I. O., Calcutta.

BENGAL SURVEY.

INDEX TO THE TRAVERSE AND TOPO SURVEY IN DISTRICT KHULNA.

1906-07. No. 6 PARTY.



Traversed in Season 1905-06.....

Traversed and Surveyed on 2 Inches = 1 Mile, in 1906-07.....

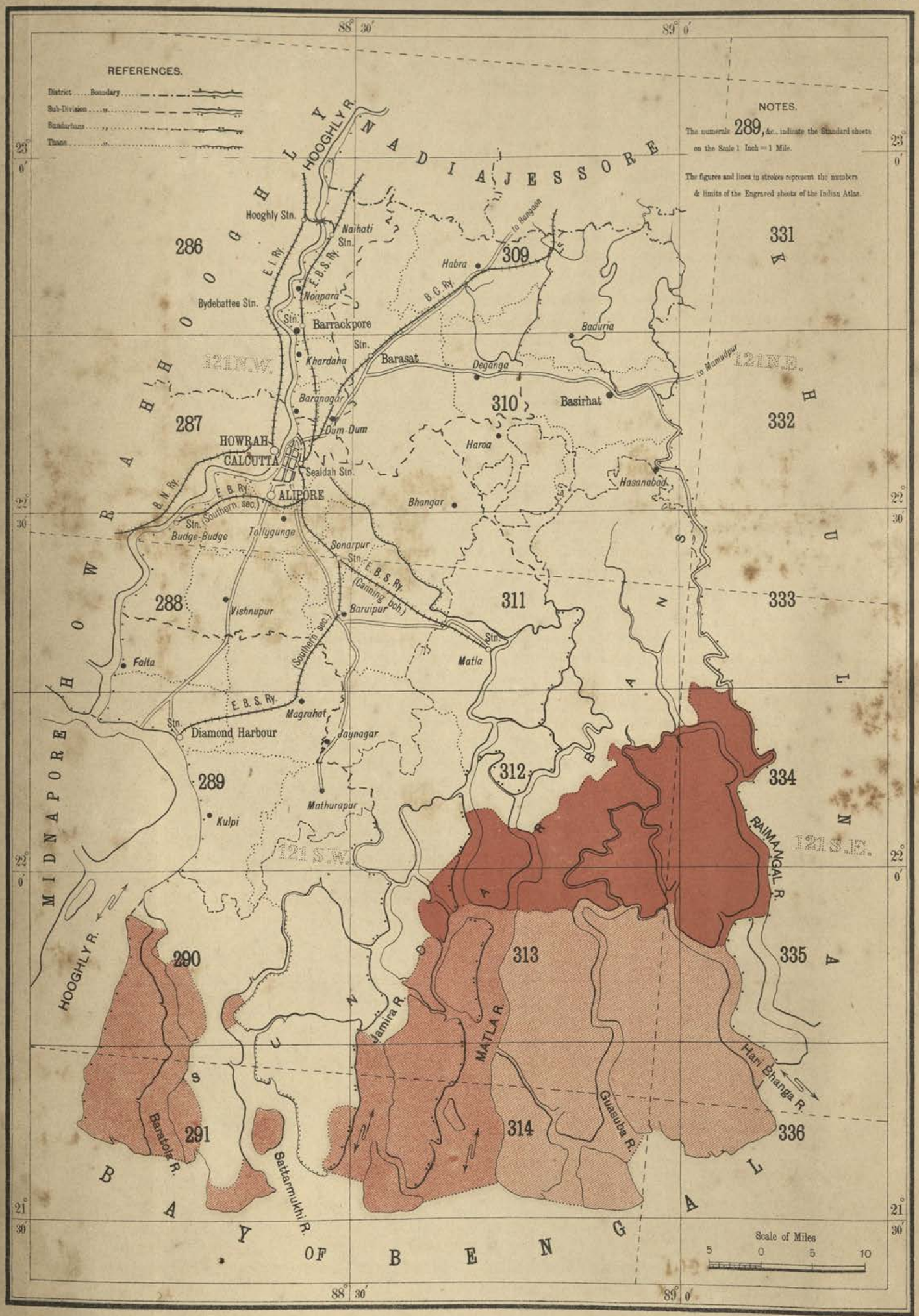
Reg. No. 1222D—08.—S. I.—525.

Helio., S. I. O., Calcutta.

BENGAL SURVEY

INDEX TO THE TRAVERSE AND TOPO SURVEY IN DISTRICT 24 PARGANAS.

1906-07. No. 6 PARTY.



Reg. No. 1221 D., 08—S. I.—325.

Traversed and Surveyed on 4 Inches = 1 Mile, Scale in 1905-06
Do. do. 3 Inches = 1 Mile, do.
Do. do. 4 Inches = 1 Mile, Scale in 1906-07

Hatho, S. I. O., Calcutta.

67. 81 Azimuths were observed and the mean Magnetic Variation is 1°-33′ East.

68. The computations are complete and the plots have been sent to the Settlement Officer, Sonthal Parganas.

DISTRICT 24-PARGANAS AND KHULNA (SUNDERBANS).

District 24-Parganas.

Traverse Survey.

69. The programme was the remaining portion of the 24-Parganas Sunderbans, including Saugor Islands (an area estimated to be 500 square miles.)

70. The operations were in continuation of those of the preceding season and connections were made with three Great Trigonometrical Stations of the East Coast Series. The error per mile works out to 7·4 feet.

71. The programme was exceeded by 138 square miles, the total area traversed being 638 square miles of which 319 square miles represent upland, and 319 square miles water areas. The angular work was checked by 61 Azimuth observations to the sun and stars, and the mean magnetic variation is East 1°-14′. The Zig-Zag system of traversing was again adopted with excellent results. The chaining amounts to 677 linear miles.

72. The theodolite was set up 2,347 times, and there are 2,169 new stations of which 303 are trunks of trees cut down to the required height, of these, the tops of 208 trunks are encased with galvanized iron cylinders. 1,866 pegs were embedded and these were surmounted with cross sticks painted white for easy identification.

73. Two steam launches, three flats and 85 boats were hired for accommodating the field establishment and for supplying the squads with food and fresh water. One Hospital Assistant, with medical stores, was constantly in the field, and the serious cases were attended to by a second Hospital Assistant at the head quarters at Canning Town. The difficulties experienced were the same as those of previous years. Severe storms, the prevalence of tigers and the possibility of being cut off from supplies of food and fresh water were the main causes of trouble and anxiety. Malarial fever and dysentry were the chief complaints; these accounted for twelve deaths.

Topographical Survey.

74. The whole area of 638 square miles traversed, was topographically surveyed on a scale of four inches to one mile and mapped on 66 sheets.

75. The detail survey was checked by 658 linear miles of check survey and, in addition, portions of nearly all the blocks were independently resurveyed; the result was most satisfactory. The Sundarbans Survey of the 24-Parganas is now completed.

76. The entire area is intersected with tidal rivers and creeks, land areas being covered with dense jungle, except in the case of Saugor Island, of which the greater portion is under cultivation. Traces of all the blocks have been prepared for the Settlement Officer and a trace map of Saugor Island for the Port Officer, Calcutta.

77. The entire season's work will be completed before the establishment takes the field on the 1st November next.

District Khulna.

Traverse Survey.

78. The order for the survey of this district was conveyed in the Board's letter No. 5889A., dated the 6th December 1906 and the establishment, on completion of the 24-Parganas Sunderbans, left Canning Town on the 8th February 1907 and encamped at Nakipur, a small village on the northern limit of the Khulna Sunderbans area. Field work closed on the 20th April when the party

returned to recess quarters at Barrackpore. The programme was the traverse and topographical survey of 840 square miles of Government Reserved forests.

79. The origin of survey adopted was the intersection of the paralells of N. Latitude 22° 30′ 00″ and E. Longitude 89° 30′ 00″.

80. The area traversed was 953 square miles (or 113 square miles in excess of the programme). The whole area was divided into 45 blocks.

81. The angular work was checked by 124 Azimuth observations to the sun and stars and the mean magnetic variation of the needle is East 1° 11′ 00″.

82. There are no Great Trigonometrical Stations in or near the area traversed. The co-ordinate values have been obtained from the 24-Parganas Sunderbans traverse survey, which was connected to the East Coast Series.

83. The theodolite was set up 4757 times and there are 4423 new stations which have been marked with 215 galvanized iron cylinders, 1,028 trunks of trees and 3,180 pegs. The Zig-Zag system of traversing was adopted and proved a complete success. There are 1105 linear miles of chaining, and the area comprises 698 square miles of upland and 255 square miles of water.

84. The nature of the country is similar to that of the 24-Parganas, Sunderbans, except that the whole tract is Government Reserve Forest containing much good timber. Khals and streams are innumerable and form a complete network over the whole area. It would be impossible to make a survey without the aid of steam launches, flats and boats as the difficulties are abnormal.

Topographical Survey.

85. The entire area of 953 square miles traversed was topographically surveyed on a scale of 2″ to 1 mile and the mapping has been done on 35 sheets.

86. The detail survey was subjected to 723 linear miles of check work and the results proved satisfactory.

87. Trace maps of the whole area have been prepared for the Forest officer, and the season's work will be completed before the camp takes the field next season. The programme of the next season is the completion of the survey of the Khulna Sunderbans, an area of about 1,050 square miles.

88. The health of the establishment was bad, mainly owing to malarial fever and dysentry. There were five deaths from dysentry and one man was carried off by a tiger.

PART III—MISCELLANEOUS SURVEYS.

BHAGALPUR DISTRICT.

Colgong Municipality.

89. This Municipally was omitted from cadastral survey in 1905-06 This year the Settlement Officer required the Municipality to be cadastrally surveyed, it being almost entirely under cultivation.

90. The area which comprises 5 Revenue Survey villages, was 2·27 square miles; 265 new traverse stations were laid down, of which 80 were iron pegs and were embedded in the town, the rest of the stations were marked with wooden pegs.

91. The cadastral survey was checked by 15 miles of test survey, which gives an incidence of 6½ linear miles of check survey to each square mile of detail survey.

92. There were 2,542 plots in the area, of which the entries of 1,005 were tested; this gives an average of 39 per cent. of the total number of entries.

93, There were two boundary disputes, both of which were settled. Of the 271 internal disputes, 183 were settled, the balance will be dealt with at attestation.

94. The attendance was good.

Mawalikabad village.

95. This village was topographically surveyed in 1903-04 and cadastrally surveyed this year. The area was 7 square miles.

Thana Kishanganj (Kosi Diara).

96. A small area of 1·7 square miles in thana Kisbanganj was traversed for cadastral survey. This area comprised two Revenue survey villages, which had been topographically surveyed in 1903-04

97. The cadastral survey was undertaken and while the survey was in progress it was discovered that only one of the two villages contained a Government estate; the survey and records of this village were completed; the area cadastrally surveyed was 1 square mile.

Purnea District.

98. Thirteen villages were traversed for cadastral survey in this district, 12 of which were in the Kosi Diara, and had been topographically surveyed in 1903-04. The villages were scattered over a considerable area, and orders to undertake the survey were received very late in the season (10th May 1907.)

99. The area traversed was 21·3 square miles, in which 490 new theodolite stations (all wooden pegs) were laid down.

100. The area cadastrally surveyed was 20·6 square miles. The records of only 8 of the 13 villages were prepared as the Collector decided that the records of the remaining five were not required.

101. The survey was checked by 7·0 miles of test survey which gives an incidence of 3·4 linear miles of test survey to each square mile of detail work.

102. The entries of 291 plots were checked, this is an average of 38 per cent. of the total number of plots.

NEPAL-DARJEELING BOUNDARY.

Mechi River.

103. In 1905-06 Mr. C. A. O'Donel was deputed to refix the positions of the boundary pillars along the Nepal-Darjeeling boundary that had disappeared and also to mark positions for reference pillars.

104. Although the Deputy Commissioner was requested to make the necessary arrangements, the pillars were not erected after Mr. O'Donel finished his work, and Mr. Newton was deputed to go over the same ground this season. Work was begun on the 1st March and completed by the 25th April. The Subdivisional Officer of Kurseong accompanied Mr. Newton along the boundary.

Nepal (Bhagalpur and Purnea Boundary).

105. The temporary marks erected along this boundary in the old bed of the Kosi river were inspected this year. It has now been decided to replace the temporary marks by pucca pillars and to build reference pillars.

This work will be taken up during the coming field season.

Jamalpur Municipality.

106. The map of Jamalpur Municipality prepared by the Railway Engineer was tested to see whether it would be, when reduced, sufficiently accurate and up to date for the standard mapping. A new survey was made, mainly because the railway map was partially out of date.

Binda Diara, District Monghyr.

107. At the request of the Collector of Monghyr, the boundary of the Binda diara was tested to see what marks had disappeared since the last survey. A re-survey of the boundary on the 16 inch scale was made and a map prepared for the Collector, showing the present boundary and the boundary surveyed a few years ago. The boundaries agreed very well.

Bhagalpur Municipality.

108. The revision of the maps and records of this area, which were prepared in 1903-04, was undertaken at the request of the Collector, it being stated that the work was originally indifferently done.

109. Every plot and every entry were checked and mistakes eliminated. The work was completed on the 26th August.

110. The total number of Municipal holdings is 33,611.

Report on the Udaipur-Bilaspur Boundary Dispute Traverse Survey.

Season 1906-07.

111. The traverse survey and demarcation of the remaining portion of the Udaipur State, touching on the Korba zamindari in district Bilaspur, was sanctioned in the Central Province Gazette Notification No. 1419, dated the 12th November 1906 and Mr. Bamanji Mancherji was appointed Boundary Commissioner in connection with the settlement of the boundary.

112. One Traverser was deputed for the Traverse Survey of the above-mentioned boundary; he was placed under the direct orders of the Boundary Commissioner. The traverser was sent to Raigarh in the beginning of December 1906 and worked there till the end of March 1907. Owing to the hilly nature of the country and also to the very heavy jungles, the traverser was detained for a longer period than was expected.

113. The traverse data of a portion of the Udaipur Boundary touching on Raigarh in District Sambalpur traversed during season 1903-04 was supplied to the Boundary Commissioner.

114. Seven Azimuths were observed and the mean magnetic variation was 1° 6′ E.

115. Only one station of the Great Trigonometrical Survey was connected with the work.

116. Out of a total number of 318 new theodolite stations 254 were marked by stones, 30 by pegs and 34 were cut on rocks "in situ."

117. The entire length of the boundary traversed was 59 linear miles.

118. The origin of the survey was the same as used in previous season's work viz. the intersection of N. Latitude 22° 30′ and E. Longitude 83° 30′ .

119. The 16-inch plots of the boundary as traversed were supplied to the Boundary Commissioner, the setting up and plotting being done by No. 5 party.

PART III.—REPORT ON MISCELLANEOUS SURVEYS.

Calcutta Suburbs Survey.

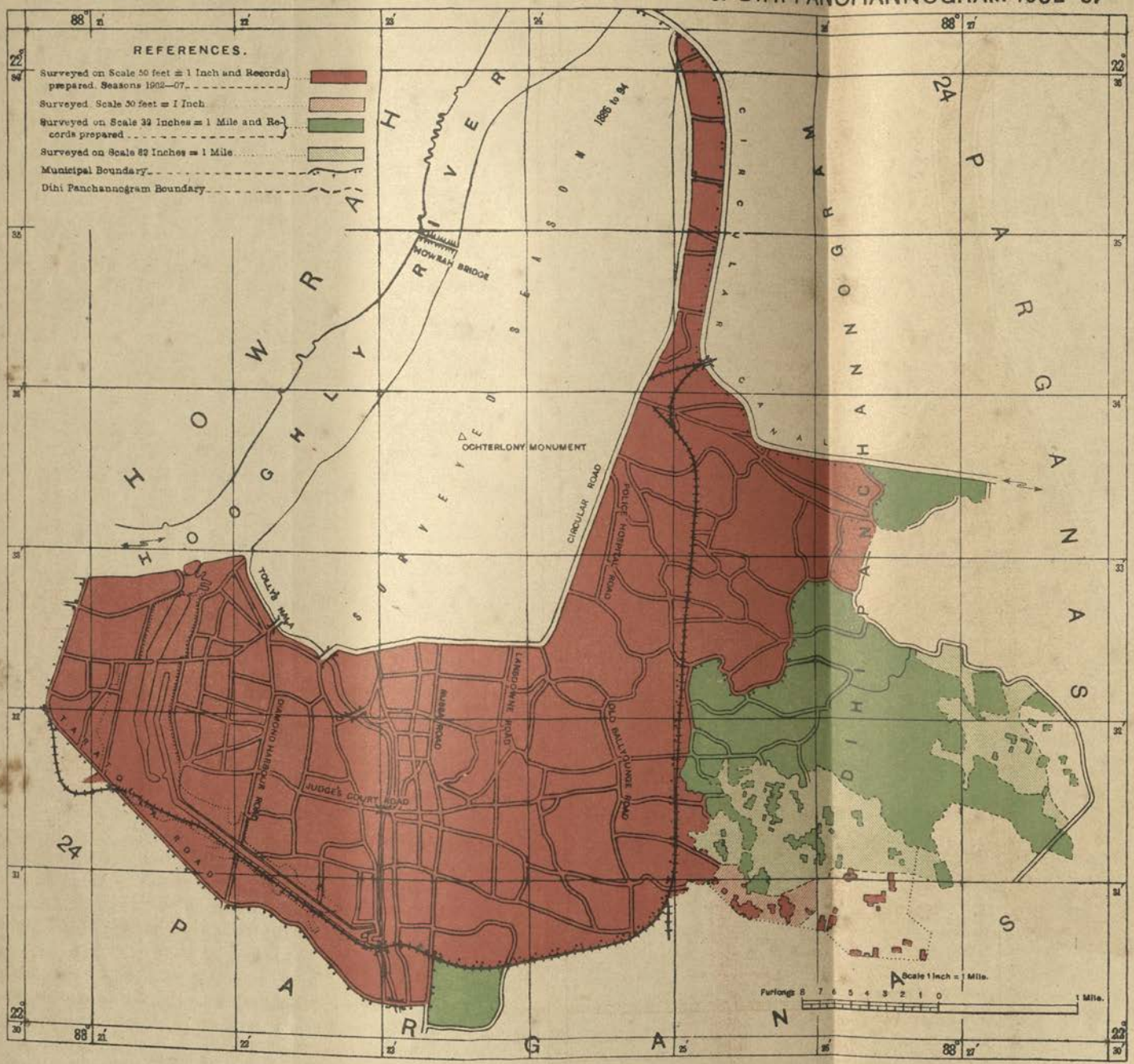
120. The work chiefly consisted of (*a*) Demarcation of holdings both insides and outside Municipal limits not traceable, (*b*) Comparison of old and new maps, (*c*) Settling boundary disputes, (*d*) Preparing fair maps for publication, (*e*) Traversing work for the Port Trust Commissioners, (*f*) Detail survey for the Port Trust Commissioner's area, (*g*) An attempt to revise those portions of the old City Survey sheets which require revision to admit of the Subarban survey sheets, which lie along the boundary between City and Subarban areas being completed to margin, (*h*) the completion of records for attestation, (*i*) area calculation.

121. With reference to item (*a*) above the demarcation of the remaining Municipal holdings was completed in 83 Municipal and 115 Panchannogram holdings outside Municipal limits; in addition a considerable number of holdings, required to be separated by the Attestation Officer, were dealt with. The demarcation cannot, however, be said to be completed until the attestation is finished.

122. Item (*b*) was reported on in paragraph 84 of the last year's report. There are some old maps which show the boundaries of villages inside the area, these are revenue boundaries and so have not been shown on the larger scale maps; on the matter being referred it was decided that the boundaries need not be shown.

123. Item (*c*). Inside Municipal limits 2,617 boundary disputes were dealt with by the end of July when the Sub-Deputy Collector, who was helping in

INDEX TO THE SURVEY
OF
THE ADDED AREA TO THE TOWN OF CALCUTTA AND PORTION OF DIHI PANCHANNOGRAM 1902-07



Reg. No. 1223 D., 08.—S. I.—825.

Zinco., S. I. O., Calcutta.

this work, reverted to his substantive appointment; during the current year 370 disputes lying inside and 241 outside Municipal limits were disposed of. There were 51 appeals preferred, all of which have been dismissed; many disputes after appeal were taken to the civil courts, but with what results we do not yet know, and so none of the boundaries have been changed; these disputes are all taken to the civil courts with reference to the claim made by the Corporation to road side drains.

124. The owners during the year have shown very much more interest in the proceedings than they have done in other years; the value of the work is apparently appreciated and where owners formerly had to be summoned to attend, they now come forward of their own accord and appply for further enquiry as regards ownership and boundaries of holdings. This appreciation has resulted in increased work, which, however, is not a matter for regret; with regard to boundaries, these can generally be disposed of, but where title is concerned, the applicants are referred to the civil courts, after documents have been inspected and depositions taken.

125. Item (*d*) is fairly well advanced; an extra officer was appointed to attend to the examination of maps and his appointment has prevented arrears of work accumulating. Out of 397 maps of the Suburban area for the Calcutta Corporation, only 37 remain to be drawn, until orders are received regarding the adjustment of the boundaries along the lines of junction of City and Suburban areas, the drawing of these sheets must be held in abeyance, the remaining 360 maps are in different stages of completion.

126. Of fair maps for revenue purposes, there will be, in all, 469 sheets drawn in skeleton on the 50-feet scale these will only show the boundaries of the holdings of the Panchannogram Government Estate with the Municipal holdings contained in each revenue holding.

There will also be 29 maps on the 32 inch scale of the Subdivision of the Panchannogram Estate lying outside Municipal limits, these maps will be drawn in detail.

Of the 50 feet maps 256 have been drawn, since, when vandyked, one set of numbers of holdings will be in red and the others in black, duplicate copies will have to be made, one showing all detail required in red and the corners of sheets and the other all other details. Only the maps of subdivisions which have been attested can be taken in hand Of the 32-inch scale maps only one has been drawn.

The examination of all the maps mentioned in this paragraph as well as the printing, remains to be done.

127. In item *e*) the only traversing done is that of 1,493 acres for the Port Commissioners; there still remains, however, a further tract to be traversed, the area to be dealt with having been under-estimated originally.

128. Item (*f*) of the Port Commissioners' area, the detail survey of 600 acres of the lands traversed was carried out; this work has been delayed by the great amount of water which accumulated during the rains, in some parts considerable areas being entirely submerged.

129. No traversing or detail survey other than that mentioned in last two paragraphs has been done during the year. The work referred to in item (*g*) has not progressed because holdings have been freely divided and in some place the old boundaires have been encroached upon, or changed; in order to facilitate this work, application has been made to have the area notified for survey under Act I of 1887.

130. The completion of survey and demarcation of one subdivision which consists of detached lands was stopped by the Collector of 24-Parganas; the work proved to be very expensive, owing to the difficulty of tracing these lands with no map to guide the surveyor, and it has been decided to postpone the attempt to survey and demarcate them, until the 24-Parganas are surveyed.

131. Item (*h*). There are 69 khasras in the Pachannogram Estate and all have been completed and submitted for attestation, the last two being despatched on the 2nd August 1907. Forty-two of the Khasras have been attested as follows:—In 1905-06 18 khasras and in 1906-07 24 khasras.

There are four other Government Estate Khasras which have been submitted but not yet attested. Until attestation is completed, the Revenue maps cannot be compiled.

132. Item (*i*) has been completed, except for areas to be divided into revenue holdings, these are dealt with as they are received from the Attestation Officer.

PART IV.—REPORT ON THE BENGAL DRAWING OFFICE.

133. Mr. L. F. Berkeley, Extra Assistant Superintendent, 1st grade, held charge until the 10th July 1907 when Mr. P. C. H. Smart, Extra Assistant Superintendent, 3rd grade, took over Mr. Berkeley's duties, the latter being on well-earned privilege leave until the close of the year under report.

134. The reproduction outturn of the office has increased considerably in the last year and the whole staff has been compelled to work long hours to meet the demands put upon it. It had been hoped that all arrears work would be completed by 1st April 1908, but, from the progress made up to the 30th September 1907, it is obvious that considerable arrears will have to be dealt with in the recess season of 1908. It cannot be said that there has been any failure so far; the plant available is insufficient to cope with the vast amount of work required, and if the plant were increased, in a year's time a portion of it would have to lie idle; to increase the plant now would therefore not be an economical move, while to obtain a larger outturn from the number of presses, etc., now availabe, seems impossible.

135. The work of the office is divided into seven main sections:—

(*a*) General or Controlling section.
(*b*) Standard Mapping section (including the preparation of District maps).
(*c*) Traverse Chart Section.
(*d*) Thana and Trijunction Mark Maps section.
(*e*) Reproduction of village Maps Section.
(*f*) Badar Section.
(*g*) Record „

Standard Mapping Section.

136. The old size of a standard map was 30 minutes of Longitude and 15 of Latitude; the size has recently been reduced to 15 minutes of Latitude and 15 of Longitude. During the year under report six standard sheets of the old size (72 $\frac{J}{10 \text{ and } 14}$, $\frac{J}{11 \text{ and } 15}$, $\frac{J}{12 \text{ and } 16}$, $\frac{K}{9 \text{ and } 12}$ $\frac{K}{10 \text{ and } 13}$ and $\frac{K}{11 \text{ and } 15}$) of districts Darbhanga, Monghyr and Bhagalpur, west of Longitude 87° E, were dealt with, a strip of 2′-27″ being added to their Eastern margins to avoid a gap occurring between these sheets and those of the new style which fall East of Longitude 87° E; this was necessary because the new style sheets will be in terms of the latest value of the Longitude of Madras. The first five (old size) sheets mentioned above have been completed and submitted for publication together with (new style) sheet $72\frac{N}{2}$. Sheets Nos. (new size) 72 $\frac{N}{3}$, $\frac{N}{4}$ and $\frac{O}{1}$ have been practically completed during the year and will be sent for publication by the end of next January; of the others being worked on Nos. (new style) 72 $\frac{O}{3}$ and 72 $\frac{O}{2}$ are well in hand.

137. The quarter inch map of the District of Darbhanga had been sent for publication and the maps of Monghyr and Bhagalpur districts should be commenced next year together with several new standard sheets of Bengal.

138. Index map of districts Puri and Patna have been completed during the year. In addition to this miscellaneous work this section has carried out the following:—

(*a*) Colouring of fiscal limits on 17 unpublished proofs of nine standard sheets.
(*b*) Final examination of 17 unpublished proofs of nine standard sheets.
(*c*) Ditto of two unpublished proofs of one district map.
(*d*) Small additions and corrections have been inserted in 20 published proofs of ten Standard sheets.
(*e*) Two inch mujmili (rough maps) of the Dompara Estate, District Cuttack and of the Koderma and Sarkari Hata Government Estate, District Hazaribagh, have been compiled.

139. Colonel Hodgson, Deputy Surveyor-General, has kindly given much time to the supervision of this section, and his orders and suggestions have very greatly facilitated the work.

Traverse Chart Section.

140. Traverse charts giving full details for the use of the Topographical Surveyor hereafter are under preparation for the whole of the Orissa Division on a scale of 1″=one mile. Orissa falls on 49 charts, of these, during the year, 13 have been sent to the Head Office of the Survey of India, 15 have been completed and are practically ready for submission, 10 have been dealt with up to the examination stage and the remainder are well in hand. As soon as Orissa is finished, North Bihar will be taken in hand on the $\frac{1}{2}$″ or 1″ scale. I propose to strengthen the section considerably so as to permit of the arrears being worked off as soon as possible and will submit proposals to this effect shortly.

141. The re-computation of co-ordinates of the trijunctions of villages so that their values from the district origin in rectangular co-ordinates may be used for the plotting of Traverse charts, has, during the year, been completed for 3,434 villages in Bihar, while the values of the trijunctions of 9,442 villages of the Orissa Division have been recomputed and either entered on the charts or are ready for entry on them.

142. In this section again Colonel Hodgson has given us much help.

Trijunction Mark and Thana Mapping Section.

143. The trijunction mark maps of ten thanas of District Darbhanga (33 copies), of three thanas of North Monghyr (208 copies) and four thanas of North Bhagalpur (256 copies), one thana of Cuttack (nine copies), completing the Cuttack District, have been prepared. Of scattered cadastrally surveyed areas maps for portions of six thanas of Gaya (22 copies) and two thanas of Patna (six copies) have been made. In District Purnea the work has been pushed forward as hastily as possible; the thanas maps of this District are urgently needed, and to meet this demand, instead of awaiting the 2″ drawing of the Standard sheets, we have had to compile special 2″ plots in many cases. The results has been less delay than would have occurred if the 2″ standard mapping had been awaited, but the system is not an economical one.

144. Three hundred and forty copies of the Trijunction mark maps of nine thanas of Ranchi and 36 copies of two thanas of Singhbhum (Sarai Kela and Kharsawan Estates) have been printed and supplied from maps prepared from mujmilis made by Settlement Officers.

145 The Thana maps of four thanas of North Bhagalpur and two thanas of Purnea District (200 copies of each) have been prepared and issued to the Director of Land Records; in addition to these 200 copies of each of nine thanas of Ranchi District and four thanas of the Singhbhum District (Saraikela and Kharsawan) have been made from traces sent by the Settlement Officer.

146. The whole question of thana mapping needs very careful consideration. I am at present in communication with the Director of Land Records on the subject, and have every hope that a system which will result in increased rapidity of outturn, economy and uniformity of method will shortly be possible.

Reproduction of Village Maps Section.

147. In paragraph 113 of last year's report, Major Crichton gave the outturn of the office for 1905-06 as 462,961 copies of maps produced by the Vandyke process and despatched. This year the outturn is 505,545 maps; both Major Crichton's and my figures exclude work done for Eastern Bengal and Assam, this comparison hardly shows the relative amount of work done in the two years because in many cases, in the year under report, the average number of pulls is smaller than it was in 1905-06 but in spite of this the outturn has been considerably increased.

148. Of the programme budgetted for the following items have been dealt with :—

(*a*) After the cursory re-examination (mentioned as necessary in last year's report) of the remaining copies printed in 1904-1905, the Issues for the whole of the *Muzaffarpur District* have been completed, 27,434 printed copies being despatched during the year.

(*b*) With regard to Champaran, the examination of the paper traces of such maps as had not been vandyked and the examination of such reproduction as had not been despatched, took up much more time than was expected, but the 39,910 copies which still remained to be despatched have been dealt with.

(*c*) In Darbhanga only 11 of the 21 sheets which remained could be traced during the year; the failure is due to the 16″ sheets of Chaprasan village having to be returned to the Cadastral Camp concerned for revision. With this exception out of a total of 9,082 sheets in the district, which fall on 7,373 paper traces, (all of which have now been examined and vandyked), 55,290 copies (out of a total of 73,730 printed) have been sent to the Collector. In this district again the cursory re-examination of the paper traces prepared in 1904-1905 has retarded despatches.

149. In North Monghyr out of an aggregate of 3,875 sheets, 3,350 were traced on 2,950 paper traces last year; this year 423 sheets have been traced on 411 paper traces and the total traced and examined is now 3,773 sheets on 3,371 paper traces; all of these except 226 have been examined and of these 226 only a portion of the examination remains to be done. Of the 102 sheets remaining to complete North Monghyr 75 have been returned to field parties and there is some doubt whether the other 27 will be required to be reproduced or not.

Forty eight thousand one hundred and forty copies of maps have been reproduced up to date as follows:—

(*a*) Two thousand four hundred and one traces originally printed (10 copies each)	24,010
(*b*) One thousand nine hundred and seventy-nine of the above re-vandyked and printed with an extra 10 copies each	19,790
(*c*) Two hundred and seventeen traces printed with 20 copies each	4,340
Total ...	48,140

150. In Purnea the work of season 1903-1904 consists of 2,264 sheets of which 307 were on thick paper from which direct reproduction was impossible; these 307 sheets, when traced, fall on 322 paper traces and the total number of sheets and traces for reproduction is therefore 2,279.

These have been vandyked on 2,297 plates, since in some cases two villages were mapped originally on one sheet, all but 30 plates, in the maps of which "badars" (corrections) have been found, have been printed, but until the "badars" are returned rectified, 5,100 copies cannot be issued.

151. The reproduction of the work of seasons 1901 to 1903 in Purnea district comprising 1,332 sheets and a requirement of 20 copies of each, vandyked from traces, has resulted in 14,120 copies being printed and 13,160 despatched.

152. Of the work in Purnea district done in 1904-1905 covering 3024 sheets, 98,960 copies of 1,119 sheets were printed and 61,850 despatched.

153. In North Bhagalpur there are, in all 2,808 sheets for reproduction; this total includes 353 sheets of the survey of 1888-1889; this has involved

a considerable amount of tracing, all the maps being on thick paper. Up to date 41,650 copies have been despatched, the balance of the work is in hand.

154. In Ranchi, of the work of 1902-1903, the 1,465 copies which remained from last year to be supplied have been despatched during the year.

155. The programme in Ranchi of 1903-1904 covered 1,497 sheets; as the attestation copies of 265 of these have only just been received for the correction of originals, only 25,860 copies of the remaining 1,232 sheets on 1,293 plates could be supplied, two or more villages mapped on one sheet having first to be separated. Of 992 sheets made in the field in 1904-1905, 20 copies of each of which are required 3,500 copies only have been supplied; the rest of the work is in hand.

156. In last year's report it was mentioned that in the Sonthal Parganas approximately 15,200 paper traces would need reproduction; the traces are being prepared by the Settlement Officer who issues copy orders. During the year 4,537 traces have been reproduced and 140,680 copies supplied, the total number of traces and copies dealt with to date being 9,316 traces and 233,250 copies.

157. In Singhbhum 1,133 sheets required reproduction; 20 copies of each sheet have been supplied.

158. In the Banki Government Estate of Cuttack, in last year's report it was mentioned that, owing to the colour having been used on the revised settlement trace maps, direct reproduction was impossible; it was also mentioned that 211 original paper traces of the 144 villages of this estate were being corrected before reproduction, and that the additions and corrections made at the time of revision survey were so numerous, that it was decided, instead of correcting the original maps, to file with the originals, copies of their corrected paper traces. Out of the 174 paper traces corrected last year discrepancies were found in 71 villages; others had to be referred back to the Collector; in addition 22 villages on 24 sheets had to be returned to the Collector for rectification, as a comparison with the originals showed the traces to be out of proportion. Of 115 villages so far sent back to the Collector 93 have been received back corrected up to date, so taking into account the 660 copies of 22 traces supplied last year only 150 traces could be vandyked in this year, 2,280 additional copies have been supplied, making a total of 2,940 copies (98 traces) to date, 30 copies of each trace being required.

159. In Angul 973 sheets have been traced, and 2 copies of each supplied. The traces fell on 1,003 sheets and so 2,006 copies were issued.

160. As regards reproduction for attestation purposes the following work was done during the year:—

District.	Number of sheets.	Number of copies supplied.
Ranchi	1,082	16,821
Dalbhum	1,368	
Monghyr	2,390	
Bhagalpur	682	

In the Sonthal Parganas, out of 150 sheets sent for reproduction, two copies each of the 14 fit for direct reproduction, were issued; the remaining 136 sheets were, owing to colours and stains occurring on them, unfit for direct reproduction and were sent back to the Settlement Officer.

The Director of Land Records is taking steps to avoid a recurrence of this occurrence and I have sent him details by which the Settlement Officer, Sonthal Parganas, will be able to dispense with tracing for attestation in future.

161. The work in Balasore District has been completed during the year; the programme consisted of the correction of 2 vandyked copies of each of the original village maps according to settlement traces. The section has corrected during the year 5,626 copies of the maps of 2,239 villages, the total to date being 8,712 copies of 3,593 villages. Of 7 villages (on 7 sheets) in this District no vandyked reproductions had been made; 10 copies of each of these were supplied.

162. In addition to the original programme this section has dealt with the following miscellaneous items:—

	Number of maps reproduced.	Number of copies.
For the Officer in charge, Calcutta Suburbs Survey, (Suburban area)	701	7,150
For the Officer in charge, Calcutta Suburbs Survey (Index map)	1	30
For the Chairman to the Corporation, Calcutta ...	15	750
For the Manager, Delang Wards Estate, Puri District	99	99
For the Executive Engineers Champaran and Brahmini-Byturni Division	98	98
For the District Engineer, Monghyr	4	4
For the Special Officer for Revision of Boundary Commissioners' Lists of 24-Parganas (2 thanas)	Nil	400
For the Officer in charge No. 4 Party specimen map for Amins in Hindi	1	1,000
For the Officer in charge No. 4 Party specimen map for Amins in English	1	100
For the Officer in charge No. 4 Party specimen 4" mujmili map for Cadastral Inspectors ...	1	100
Total ...		9,731

163. One hundred and eighty-five original sheets of District Ranchi (1903-04) and 1,297 of District Purnea (1904-05) were touched up for direct reproduction in this section during the year.

Badar Section.

164. During the year the "badars" of 2 villages of Monghyr, 208 of Bhagalpore, 1,745 of Purnea, 550 of Ranchi and 163 of Singhbhum have been received and corrected on the original maps; the "badars" of 453 villages of Midnapore have been received and, of these, 433 have been dealt with.

165. The headings and adjoining villages names have been corrected according to the numbering and spelling given in thana lists on 3,108 sheets of Purnea, 123 of Bhagalpur, 182 of Monghyr, 435 of Midnapore 1,134 of Singhbhum and 2,055 of Ranchi.

166. Village names have been corrected and thana numbers entered for 112 villages of Muzaffarpur and 180 villages of Darbhanga, in the traverse volumes, and, in the field books, of 402 villages in Muzaffarpur. This work has not progressed as rapidly as it might have owing to the large amount of touching up of original sheets for reproduction and inking of scales which has been required to be done for Bengal and Eastern Bengal.

167. The touching up for reproduction of 773 sheets of Midnapore, 1,134 of Singhbhum and 1,044 of Ranchi has been completed; and scales have been inked on 2,247 sheets of Purnea and 66 of Ranchi; thana lists for 918 villages of Singhbhum have also been made.

Map Record Section.

168. In accordance with the orders of the Board of Revenue, estimates have been submitted during the year for safe guarding records against fire and the ravages of insects, &c. The proposals include the substitution of iron for wood in the existing record racks, the enclosing with iron bars of the actual part of the room in which records are kept from that in which record-keepers do their clerical work, the laying on of an unfiltered water-supply with the necessary apparatus for extinguishing fire and lastly the provision of telephonic communication with the headquarters of the Calcutta Fire Brigade.

169. During the year 4,854 original sheets of Bengal and Eastern Bengal have been received making a total to date of 101,715 sheets, of which 88,695 have been racked, the rest are at present in use in different sections of the office in which they are locally racked.

170 Lists (either Thanawar or Parganawar) have been prepared for 25,157 sheets during the year; the total dealt with so far being 89,590 sheets;

lists of the balance in the office are either in course of preparation or will be compiled as soon as the thana lists are received.

171. Serial numbers have been pasted on 23,014 sheets during the year, 74,596 having been dealt with up to date; this work is proceeding rapidly and steadily. 10,811 sheets have been repaired with cloth and 16,102 paper traces with lists complete have been stored in the section during the year; in all 37,624 paper traces have now been stored.

172. I hope shortly to make arrangements by which Eastern Bengal and Bengal sheets may be racked separately in the office, but am not yet ready to put forward detailed suggestions.

CHAPTER III.

PART I—TOURS OF THE SUPERINTENDENT, PROVINCIAL SURVEYS, BENGAL.

173. Major Crichton took the field at the end of October 1906 and between then and the date on which he went on leave visited and inspected each section working under him at least once. As I took over charge towards the close of field season, I was unable to inspect each section before going into recess, but, during a monsoon tour of 7 weeks during July and August, I visited each office under me and also inspected the maps of Ranchi and Singhbhum made by the Settlement Officer, Chota Nagpur. I hope next field season to be able to do a considerable amount of field inspection, but this depends on whether I am allowed a personal assistant or not; suggestions have been put forward by the Board for the provision of a Personal Assistant.

PART II—SERVICES OF OFFICERS.

174. Amongst the executive officers I specially commend to the notice of the Board Mr A. W. Smart; as the officer in charge No. 6 party, his work has fallen partly in Bengal and partly in Eastern Bengal; in Bengal he has so far carried out the Sunderbans Survey with conspicuous success; his former services in Revenue work are well known and need no comment.

Messrs. R. B. Smart (Officer in charge, Calcutta Suburbs Survey), L. F. Berkeley (Officer in charge, Bengal Drawing Office) and N. Bedford, (Officer in charge, No. 4 party), have all done excellent work, whilst Mr. C. S. Kraal has worked well as the Officer in charge No. 5 party.

Amongst the junior officers I would draw the attention of the Board to the services of Mr. P. F. Delaney who has held charge of the Sunderbans Survey Camp throughout the year; Mr. Delaney is a most promising officer.

With one exception the remaining officers have all worked well; the exception has since been transferred from Bengal Surveys.

I have the honour to be,

SIR,

Your most obedient servant,

F. C. HIRST, CAPTAIN, R.A.,

Offg. Superintendent of Provincial Surveys, Bengal.

APPENDIX I—PART A.

Summary of outturn of work of the Survey Parties in Bengal for 1906-1907.

Districts	Traversing.					Cadastral Survey.				Record-writing.		Topographical Survey.
	Number of villages.	Linear miles of chaining.	Number of stations at which the theodolite was set up.	Number of azimuths.	Number of sub-traverses.	Villages.	Fields.	Linear miles of test survey.	Sheets.	Villages.	Fields.	Square miles. (a)
1	2	3	4	5	6	7	8	9	10	11	12	13
Private Estates.												
Monghyr	1,143	3,283	15,284	79	1,086	1,151	936,429	4,636	2,284	1,151	936,429	...
Ditto Hill block	5	117	1,550	4	50	39	6,239		103	39	6,239	...
Patna	1,453	3,379	16,165	62	952	...	...	...	...	...	...	...
Bhagalpur	...	...	...	...	...	204	245,167	1,238	676	207	337,697	...
Puri	95	430	1,455	14	126	...	...	...	...	...	...	...
Midnapore	48	96	507	6	23	...	...	...	...	...	...	...
Ranchi	707	3,568	17,516	128	994	...	...	...	...	...	...	...
Singhbhum	573	2,082	15,410	102	619	...	...	...	...	...	...	...
Sonthal Parganas	1,355	3,293	14,997	81	791	...	...	...	...	...	...	...
24-Parganas—Sundarbans ...	(c)32	677	2,347	61	(b)	...	...	...	...	...	...	638
Khulna ditto	(c)45	1,105	4,757	124	(b)	...	...	...	...	...	...	953
Miscellaneous.												
Bhagalpur, Colgong Municipality ...	5	...	265	...	...	5	2,542	...	...	5	2,542	...
Ditto Mawalikabad ...	1	...	...	...	...	1	...	...	...	1	...	...
Ditto Kosi Diara	2	...	...	...	...	2	...	...	...	2	...	...
Purnea ditto	13	...	...	...	...	13	...	...	...	8	...	...
Total ...	5,477	18,030	90,253	661	4,641	1,415	1,190,377	5,874	3,063	1,413	1,282,907	1,591

(a) This work is not Cadastral Topographical Survey, and therefore square miles have been substituted for the old heading "Villages."
(b) True Topographical work cannot be given.
(c) Blocks, not villages.

F. C. HIRST, CAPTAIN, I.A.,

Offg. Superintendent of Provincial Surveys in Bengal.

APPENDIX I—PART B.

Statement of Outturn and Cost-rates.

DISTRICT AND ESTATE.	Description of work.	Estimated area to be dealt with in square miles.	Year of inception of operations.	AREA SURVEYED IN SQUARE MILES. During the year under report.	AREA SURVEYED IN SQUARE MILES. Total including previous years.	COST-RATE PER SQUARE MILE. During the year under report.	COST-RATE PER SQUARE MILE. From beginning to end of the year under report.	Balance of area remaining to be surveyed.	Estimated cost of completing the area in column 9.	Estimated final cost rate per square mile.	REMARKS. [Explanation of unusually high expenditure.]
1	2	3	4	5	6	7	8	9	10	11	12
Private Estates.						Rs.	Rs.	Rs.	Rs.	Rs.	
Monghyr	Traverse ...	2,132	1905	(a) 1,190	2,132	35·9 (f)	38·1	Nil	Nil	38·1	(a) Includes 275 square miles triangulation area for topographical work and also 3 square miles of Government estate previously surveyed but re-traversed.
	Cadastral ...	2,132	1906	(b) 1,307	1,307	53·0	53·0	Nil	(g)	(g)	
	Records ...	2,132	1906	(b) 1,307	1,307	52·0	52·0	Nil	(g)	(g)	(b) Includes 157 square miles triangulation area for topographical work.
	Triangulation ...	275	1906	(c) 275	275	...	...	Nil	(h)	(h)	
Patna	Traverse ...	2,075	1906	(d) 852	852	34·2 (f)	34·2	1,223	41,800	34·2	(c) Also included in (a).
Bhagalpur	Cadastral ...	3,572	1902	375	3,572	61·1	66·4	Nil	...	66·4	(d) Includes 22 square miles of old scattered work re-traversed.
	Records ...	3,572	1902	538	3,572	48·4	59·5	Nil	...	59·5	
Puri (Chilka lake) ...	Traverse ...	97	1906	97	97	49·1	49·1	Nil	...	...	(e) Included in area previously reported in former report.
Midnapore (Dalbhum) ...	Do. ...	15	1906	15	15	24·8	24·8	Nil	...	...	(f) Includes cost of Monghyr triangulation.
Ranchi	Do. ...	7,081	1901	1,128	5,926	37·3	34·7	1,155	40,400	34·5	
Singhbhum (Dalbhum) ...	Do. ...	1,173	1905	601	1,173	30·4	33·6	Nil	...	33·6	(g) Depends on the rates at which the Settlement Department works.
Sonthal Parganas ...	Do. ...	1,604	1905	807	1,604	26·6	31·8	Nil	...	31·8	
24-Parganas-Sundarbans	Do. ...	1,688	1905	638	1,688	47·2	49·2	Nil	...	49·2	(h) Expenditure is being included in the ordinary traverse programme.
	Topographical 4"	1,232	1905	638	1,232	28·8	30·9	Nil	...	30·9	
Khulna (Sundarbans) ...	Traverse ...	2,003	1906	953	953	58·2	58·2	1,050	61,110	58·2	
	Topographical 2"	2,003	1906	953	953	34·7	34·7	1,050	36,440	34·7	
Miscellaneous.											
Calcutta Suburbs Survey (Port Commissioners' area.	Traverse ...	2	1906	2	2	...	...	Nil	...	...	
	Detail ...	2	1906	1	1	...	...	1	...	...	
Bhagalpur (Colgong Municipality).	Traverse ...	2	1906	2	2	...	...	Nil	...	...	
Bhagalpur Mawalikabad ...	Traverse and Cadastral.	1	1906	1	1	...	...	Nil	...	...	
Do. Kosi Diara ...	Ditto ...	2	1906	2	2	...	...	Nil	...	...	
Purnea Ditto ...	Ditto ...	21	1906	(e) 21	21	...	...	Nil	...	...	
Totals ...	Triangulation ...	275	...	...	...	...	...	...	...	...	
	Traverse ...	6,309	...	...	...	...	...	...	...	...	
	Cadastral ...	1,683	...	...	..	...	...	...	...	...	
	Records ...	1,845	...	...	...	...	...	...	...	...	
	Topographical ...	1,591	...	...	...	...	...	...	...	...	

F. C. HIRST, CAPTAIN, I.A.,

Offg. Superintendent of Provincial Surveys in Bengal

APPENDIX II.

Statement of sums expended.—For the year ending 30th September 1907.

District, etc.	Description of work.	Expenditure incurred during the year under report.				Total expenditure from inception to end of the year under report.			
		Actual (direct) cost.	Share of Superintendent of Provincial Surveys, pay and cost of his office.	Four per cent. charge for instruments.	Total.	Actual (direct) cost.	Share of Superintendent, Provincial Surveys' pay and cost of his office.	Four per cent. charge for instruments.	Total.
1	2	3	4	5	6	7	8	9	10
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Bhagalpur	Traverse ...	1,370	75	58	1,503	97,813	5,279	4,123	1,07,215
	Cadastral ...	20,875	1,144	881	22,900	2,14,857	13,237	9,123	2,37,217
	Records ...	23,743	1,298	1,002	26,043	1,92,140	12,290	8,176	2,12,606
Monghyr	Traverse ...	29,969	1,602	1,263	32,834	64,709	3,447	2,726	70,882
	Cadastral ...	63,224	3,440	2,666	69,330	63,224	3,440	2,666	69,330
	Records ...	62,012	3,390	2,616	68,018	62,012	3,390	2,616	68,018
Patna	Traverse ...	26,570	1,435	1,120	29,125	26,570	1,435	1,120	29,125
Sonthal Parganas	Do. ...	19,616	1,058	827	21,501	46,547	2,485	1,961	50,993
Ranchi	Do. ...	38,332	2,070	1,616	42,018	1,88,478	10,303	6,793	2,05,574
Singhbhum—Dalbhum ...	Do. ...	16,677	913	704	18,294	36,774	1,978	704	39,456
Midnapore Ditto	Do. ...	341	17	14	372	341	17	14	372
24-Parganas—Sundarbans ...	Traverse for topo.	28,565	1,536	...	30,101	78,888	4,203	...	83,091
	Topo. 4" ...	17,443	957	...	18,400	36,197	1,948	...	38,145
Khulna Ditto	Traverse for topo.	50,588	2,742	2,133	55,463	50,588	2,742	2,133	55,463
	Topo. 2" ...	30,142	1,648	1,272	33,062	30,142	1,648	1,272	33,062
Miscellaneous.									
Calcutta Suburbs Survey, including Revenue work and Panchannagram.	Traverse ...	928	50	...	978	64,522	3,379	...	67,901
	Cadastral ...	28,213	1,545	...	29,758	1,33,953	7,301	...	1,41,254
	Records ...	8,977	488	...	9,465	34,790	1,761	...	36,551
Patna—Diara	Traverse ...	111	6	5	122	4,936	234	206	5,376
Purnea—Kosi Diara ...	Traverse ...	395	17	16	428	395	17	16	428
	Cadastral ...	1,433	77	60	1,570	1,433	77	60	1,570
	Records ...	279	14	12	305	279	14	12	305
Bhagalpur—Kosi Diara ...	Traverse ...	450	23	19	492	450	23	19	492
Darjeeling—Nepal Boundary ...	Do. ...	887	46	37	970	2,923	153	123	3,199
Monghyr—Binda diara ...	Cadastral ...	33	2	1	36	33	2	1	36
Bhagalpur, Municipality arrears ...	Do. ...	1,831	79	76	1,986	2,017	89	83	2,189
Bhagalpur, Colgong Municipality arrears	Traverse ...	524	27	22	573	524	27	22	573
Monghyr, Jamalpur Municipality arrears.	Cadastral ...	6	...	...	6	6	...	...	6
Monghyr—Hill blocks ...	Topo. 2" ...	5,779	313	244	6,336	5,779	313	244	6,336
	Cadastral ...	1,155	62	48	1,265	1,155	62	48	1,265
	Records ...	490	25	20	535	490	25	20	535
Bhagalpur—Arrears ...	Cadastral ...	299	16	12	327	299	16	12	327
	Records ...	5,874	317	248	6,439	5,874	317	248	6,439
Do. Budars	Cadastral ...	2,891	152	122	3,165	2,891	152	122	3,165
Monghyr do	Do.	292	15	12	319	292	15	12	319
Purnea—Arrears	Cadastral ...	2,652	90	110	2,852	21,038	1,064	884	22,986
	Records ...	1,015	53	42	1,110	1,015	53	42	1,110

APPENDIX II—*concluded.*

Statement of sums expended. For the year ending 30th September 1907—concluded.

District.	Description of work.	Expenditure incurred during the year under report.				Total expenditure from inception to end of the year under report.			
		Actual (direct) cost.	Share of Superintendent, Provincial Surveys' pay and cost of his office.	Four per cent. charge for instruments.	Total.	Actual (direct) cost.	Share of Superintendent, Provincial Surveys' pay and cost of his office.	Four per cent. charge for instruments.	Total.
1	2	3	4	5	6	7	8	9	10
Miscellaneous—concluded.		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
Purnea—Tadars	Cadastral ...	3,162	166	133	3,461	3,162	166	133	3,461
Bhagalpur—Kosi diara Arrears	Do. ...	103	6	4	113	103	6	4	113
	Records ...	94	5	4	103	94	5	4	103
Puri—Jagir Mahals	Traverse ...	4,345	237	184	4,766	4,345	237	184	4,766
Singhbhum—Demarcation of boundary between Dalbhum Estates and Mourbhanj Estates.	Traverse ...	610	31	26	667	610	31	26	667
Udaipore Political Estates.	Boundary Survey. Traverse ...	600	30	26	656	600	30	26	656
Ranchi—Arrears	Cadastral ...	647	32	27	706	2,733	143	115	2,991
Midnapur—Jalamutha and Majnamutha Arrears.	Cadastral ...	516	26	22	564	516	26	22	564
Midnapur—Nayabashan and Rohini Arrears.	Traverse ...	514	26	...	540	514	26	...	540
Singhbhum—Seraikela and Kharsawan—Arrears.	Cadastral ...	352	17	15	384	2,126	111	89	2 326
Total ...	Traverse ...	2,21,392	11,941	8,070	2,41,403	6,70,527	36,046	20,196	7,26,769
	Cadastral ...	1,27,684	6.869	4,189	1,38,742	4,49,838	25,907	13,374	4,89,119
	Records ...	1,02,484	5,590	3,944	1,12,018	2,96,694	17,855	11,118	3,25,667
	Topographical ...	53,364	2,918	1,516	57,798	72,118	3,909	1,516	77,543
Bengal Drawing Office ...	Standard maps ...	14,321	780	...	15,101	85,035	4,920	...	89,955
	Traverse chart ...	868	45	...	913	868	45	...	913
	Record section ...	2,825	150	(e)119	3,094	16,974	863	119	17,956
	Badar section ...	5,364	285	(e)226	5,875	18,638	1,050	226	19,914
	Thana maps ...	3,253	172	(e)137	(a)3,562	11,390	671	137	12,198
	District maps ...	582	27	(e)24	633	582	27	24	633
	Trijunction mark maps.	1,796	95	(e)76	(b)1,967	5,522	276	76	5,874
	Reproduction for attestation.	6,079	330	(e)256	6,665	12,627	662	256	13,545
	Reproduction of village maps.	58,312	3,176	(e) 2,459	(c)63,947	3,21,466	17,808	2,459	3,41,733
	Correction of copy Orissa maps.	2,619	143	(e)110	2,872	3,205	174	110	3,489
	Correction and touching up of maps of Midnapore.	332	16	(e)14	362	332	16	14	362
	Preparation of 2" Mujmulli maps of Singhbhum.	116	6	(e)5	127	116	6	5	127
	Extra Departmental work.	1,706	87	(e)72	(d)1,865	3,612	188	72	3,872
Grand Total ...	.....	6,03,097	32,630	21,217	6,56,944	19,69,544	1,10,423	49,702	21,29,669

(a) Includes work done for Director of Land Records Bengal.
(b) Of Bihar, Orissa, Singhbhum and Ranchi.
(c) Sonthal Parganas, Bihar, Ranchi and Midnapore.
(d) Copies of maps, &c., supplied to applicants on payment.
(e) Four per cent. for instruments charged under orders of Comptroller General.

F. C. Hirst, Capt., I.A.,
Offg. Superintendent of Provincial Surveys in Bengal.

B. S. Press—31-12-1907—30547—370—J. A. C. M.

REVENUE DEPARTMENT.

LAND REVENUE.

CALCUTTA, THE 9TH APRIL 1908.

RESOLUTION—No. 2136L.R.

READ—

The Survey and Settlement Reports for the year ending the 30th September 1907, with the remarks of the Board of Revenue thereon.

The Reports of the Superintendent of Provincial Surveys and the Director of Land Records for the year ending the 30th September 1907, which were due on the 15th January, did not reach Government until the 2nd March. The Settlement Report has slightly exceeded the prescribed maximum limit of pages. A narrative of the revisional settlement operations started during the year in Orissa is an important new item, while the transfer of the control of cadastral operations from the Survey of India to the Settlement Department has further added to the subject matter; but it should be possible to curtail the Report in other directions by eliminating minor details, and by giving less space to small settlements.

2. The operations of the Survey and Settlement Departments extended over fourteen districts in all parts of Bengal. But the bulk of the work was done by the Settlement Officers of Bihar, Chota Nagpur and the Sonthal Parganas, who were engaged, respectively, in (1) Monghyr and Bhagalpur, (2) Ranchi and Dhalbhum, and (3) the Sonthal Parganas. The programme was adhered to very closely. The outturn, as shown in the margin, greatly exceeded that of the previous year. The total area for which a record-of-rights has been prepared in Bengal is now close on 40,000 square miles. The Superintendent of Provincial Surveys is still in charge of operations both in this Province and in Eastern Bengal and Assam. This is not a satisfactory arrangement, and a scheme for separation is now being considered.

	1905-06. Sq. m.	1906-07. Sq. m.
Traverse survey	5,591	6,309
Cadastral ,,	3,676	4,176
Topographical ,,	1,095	1,591

3. The Lieutenant-Governor is glad to notice a progressive decline in the expenditure on survey and settlement operations. The cost-rate of traverse survey was nearly stationary in Ranchi, but in Dhalbhum it fell from Rs. 36·9 to Rs. 30·4 per square mile. There was an apparent rise in Monghyr, but this was due to extra triangulation carried out for topographical purposes. There was a much more noticeable reduction in the cost of cadastral survey and initial record-writing. This work was still being done by the Survey Department in the districts of Bhagalpur and Monghyr. In the former, the cost-rate fell from Rs. 134·7 to Rs. 109 per square mile, while in the latter, where the work was newly started, it was only Rs. 105. In the district of Ranchi where for the last two years, the system has been introduced of carrying on cadastral operations through the agency of the Settlement Department assisted by a Survey Department officer as professional adviser, the cost-rate was still lower. It was Rs. 86·24 as against Rs. 89·52 in 1905-06, and an average of more than Rs. 100 in the previous years when the work was still in direct charge of the Survey Department. The average of these previous years was of course affected by the heavy expenditure which has to be incurred on buildings, tents and other non-recurring charges at the beginning of a settlement. This is exemplified in the case of Singhbhum where the reported cost-rate of 1906-07 is Rs. 124, but a much smaller rate is anticipated for the area completed in the current field season. On the other hand, the rates of the Settlement

Department have it to their credit that they include the cost of supervision of initial record-writing by Revenue Officers which was excluded from the Survey Department rates. On the whole, the Lieutenant-Governor is satisfied that the new system has been a success, and he endorses the remark of the Director that the lowness of the cost-rate is highly creditable to the Settlement Officer. It is hoped that equally satisfacfory results will be attained in the Bihar districts, where the same system of cadastral sur vey control has been introduced from October 1907.

4. The settlement operations in Chota Nagpur have resulted in the accumulation of a mass of information regarding the local agrarian conditions and customs and the main causes of dispute between landlord and tenant. The existing law has been carefully reviewed in the light of this information, and a Bill has been drafted which it is hoped shortly to introduce into Council, and which, when passed, may be expected to provide a satisfactory settlement of this troublesome subject. Paragraphs 109, 111, 122 and 123 of the Report under review contain some interesting remarks regarding occupancy and jungle rights, rents, village headmen, etc.

5. During the attestation proceedings in South Bhagalpur it was found that illegal enhancements had been made almost universally whenever an estate had changed hands. In many cases they were defended on the ground of landlords' improvements, but the rents had been enhanced to such an extent that the outlay on the improvement was very speedily recouped. In one case, after the issue of the notification under section 101 (1) of the Bengal Tenancy Act, ordering the survey and the preparation of a record-of-rights, the landlord moved the Civil Court under section 158 (1) (*d*) for a declaration of the rent payable, and induced the raiyats to agree to an illegal enhancement. The Civil Court accepted the compromise without enquiry. In future such proceedings will be prevented by the amending Act of 1907 (Bengal Act I of 1907).

The prevalence of the farming system of estate management was a special difficulty in South Bhagalpur, as it raised complicated problems of status and rent enhancement. The difficulty arose in a more intense form in South Monghyr where it was left to be disposed of in the attestation of the following year. A new feature of the work was the preparation of a special irrigation record to which considerable attention was given.

6. Settlement of fair rents in the district of Purnea resulted in a moderate enhancement of 8·62 per cent. It was allowed mainly on the ground of a rise in prices. The settlement of rents in the Balarampur estate of the Midnapore district caused an increase of 57 per cent. in the rent-roll. The main portion of the enhancement was derived from the reassessment of tenure-holders who had enjoyed without alteration of their rents all the profits of the extensive reclamation that had occurred in the estate since the previous settlement. The enhancement was eased off in the majority of cases by progressive assessment. Raiyats' rents were enhanced by 3 annas in the rupee which was more than justified by the rise in prices. Proposals were submitted during the year for the assessment of the large temporarily-settled estates of Jallamutha and Majnamutha which are now under direct management. Here also it has been decided to take an enhancement of 3 annas in the rupee on the ground of rise in prices.

7. The recovery of costs was stopped in Purnea in consequence of loss of crops caused by floods. Out of a total demand of Rs. 7,18,639, only Rs. 50,822, which was voluntarily paid by landlords, was realized. In Ranchi the full demand of the year (Rs. 1,66,569) was collected; and the Lieutenant-Governor observes with satisfaction that recourse to the certificate procedure was necessary for only Rs. 736 payable by landlords.

8. The revision of the records of the last settlement of Orissa, with a view to their continuous maintenance, was commenced in Balasore in December 1906. The progress was very slow. This was due in a great measure to sickness amongst the subordinates, the novelty of the work and the inexperience of most of the supervising staff. But it was also due in part to over-elaboration in the initial record-writing, which seriously retarded attestation. A simpler procedure has now been prescribed, and the staff has been reorganized. It is hoped that this will ensure more rapid progress in future.

The maintenance of records in Sambalpur was carried on satisfactorily. The present Report shows some improvement in the record of mutations and inspection of rent-rolls of Government estates; but in Wards' estates there was a falling-off as compared with the previous year. The Board of Revenue will shortly issue revised rules on this subject.

9. The Lieutenant-Governor has read with pleasure the remarks made by the Director of Land Records regarding the extended use which is being made of settlement records by the Courts and Executive officers of Government. It is stated that they are now freely referred to by the Civil and Criminal Courts, and are generally accepted as presumptive evidence of the facts recorded in them. They form the basis of management in all Government and Wards' estates. The thana index-maps, which are compiled from the village cadastral maps, have been found most useful for District Board work, for the reorganization of Chaukidari Unions and for many other administrative purposes. In Ranchi it is said that no case relating to land is now disposed of without reference to the settlement records, and that the decisions of attestation officers as to rents and rates of rent are seldom contested. With regard to this district, it is also stated that the raiyats are now realizing fully the benefits of the settlement operations, and are understanding the rights which have thereby been secured for them. In the districts of Purnea, Shahabad and Singhbhum, however, the officers of the Registration Department do not appear to have insisted, as elsewhere, upon the description of lands by survey plot numbers in documents presented for registration. This will be brought to the notice of the Inspector-General of Registration. Steps are being taken to ensure similar identification of lands in civil suit plaints, sale certificates, etc. The system of deputing a few Munsifs every year to settlement work is being attended with very satisfactory results. The main object is of course to give them a practical knowledge of settlement procedure, and thereby to lead to a better appreciation of the record-of-rights in the Civil Courts. But apart from this, most of the Munsifs have proved most useful Assistant Settlement Officers.

10. The inspection and restoration of boundary-marks received considerable attention during the year, but a large number of damaged or missing marks still remain to be restored. Efforts should be made to have all such marks restored without undue delay.

11. The Lieutenant-Governor has already placed on record his appreciation of Major Crichton's valuable services during the sixteen years for which he was in the Bengal Provincial Survey Department. He was succeeded, in March 1907, by Captain F. C. Hirst, who has made an excellent start. The post of Director of Land Records was held successively by Messrs. Lister, Kerr and McPherson. His Honour's acknowledgments are due to these officers, and also to Messrs. Reid, Allanson, Murphy, and Taylor, and to the other officers named in the concluding paragraphs of the two Reports.

12. Extracts from the two Reports are published for general information.

ORDER.—Ordered that this Resolution be published in the *Calcutta Gazette*, and that a copy of it, with copies of the two Reports and the Board's note, be submitted to the Government of India.

By order of the Lieutenant-Governor of Bengal,

E. A. GAIT,

Chief Secy. to the Govt. of Bengal.

No. 2137.

COPY, with copies of the two Reports, forwarded to the Surveyor-General, India, for information.

No. 2138.

COPY, with copies of the two Reports, forwarded to the Political Department of this Government, for information.

No. 2139.

COPY, with a copy of the Settlement Report, forwarded to the Appointment Department of this Government, for information, with special reference to paragraph 11 above.

No. 2140.

COPY, with a copy of the Settlement Report, forwarded to the General Department of this Government for the favour of necessary action with reference to paragraph 9 above.

By order of the Lieutenant-Governor of Bengal,

A. H. LEY,
Under-Secy. to the Govt. of Bengal.

CALCUTTA;
The 9th April 1908.

B. S. Press—10-4-1908—21663—1,014—T. N. R.

00133047

Digitized with financial assistance from

Government of Maharashtra

on 01 February, 2020